JUN 2 1931

The Research Quarterly

of the

American Physical Education Association

Vol. I OCTOBER, 1930 No. 3

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Published March, May, October and December

Vol. 1, No. 3. Ann Arbor, Michigan Subscription $3.00 per year

The Winged Victory Speaks

This fall we are publishing *"The History of Physical Education in Women's Colleges"* by Dorothy Ainsworth. This book is a result of long and careful research. Students of the history of that subject will welcome her material. It is liberally illustrated with pictures of bygone times. Price $2.00.

Another book that will be of great interest is *"The Principles of Women's Athletics"* by Florence Somers. Miss Somers has put into practical text-book form the fundamental principles underlying women's athletics. This book, we are sure, will meet with wide approval. Price $1.60.

Also, we are pleased to announce that *"Field Hockey for Coaches and Players"* by Hilda V. Burr, the noted English sportswoman, will be ready for distribution in September. This book, we believe, is the most complete study of Field Hockey that has yet appeared. It is copiously illustrated with action photographs. The price will probably be $2.00.

In passing we wish to mention *"The Rhythm of the Redman"* by Julia Buttree and illustrated by Ernest Thompson Seton which we published last June. The sales to date have greatly exceeded our expectations. Collectors have purchased it because of the valuable collection of Indian Songs, Dances and Ceremonies and because of Mr. Seton's true reproductions of Indian Art, etc. Also, teachers are finding the Indian Material inspiring to teach. We heartily recommend this book as a permanent addition to your library. The price is $5.00.

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A. S. BARNES AND COMPANY

Publishers

67 West 44th Street

NEW YORK

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Published March, May, October and December
Elmer D. Mitchell, Editor
Box 362, Ann Arbor, Michigan
Subscription $3.00 per year Single copies, $1.00 each

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Entered as second class matter March 22, 1930, at the Post Office at Ann Arbor, Michigan, under the Act of March 3, 1879.

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The Physique of Women Students at Newcomb College of Tulane University. I. Stature and Weight

By Harley N. Gould

Department of Biology, Newcomb College of Tulane University, New Orleans

FOREWORD

THIS addition to the literature on the body measurements of college women has seemed worth while in view of the general desirability of increasing the available knowledge of female physique; and there are two features which in particular justify the present study. First, the territory whence Newcomb College draws its students differs, in climate and consequently in the habits of its people, from regions involved in other such studies. Second, the material available has made it possible to follow the physical development of individuals throughout four years of college and to bring out the yearly and seasonal changes in physique, an undertaking for which data were unavailable in most of the related investigations.

MATERIAL

Source of Records

In 1909 the Department of Physical Education of Newcomb College began to make a series of records for each student. The department was then, and has been until the close of the session of 1928-9, under the direction of Miss Clara G. Baer, and the measurements have been taken by her, or, during recent years, by her assistants under her supervision and after a period of training. During the years covered by the records there has been no change in the methods of taking measurements which would significantly affect the results.

On entrance to college each student is required to fill out a history card stating, among other things, age, place of birth, and nationality of the two parents. All physical measurements are entered on a second card. The following measurements are taken in the fall of the freshman year *and every six months thereafter as long as the student attends college*: weight; height, standing at ease; full height; circumference of chest at rest, at inhalation and at exhalation; right and left hand grips; and vital capacity. In addition, several measurements not used in the present study are taken in the fall of the freshman year and in the spring of the senior year.

These records have been made available to me through the cour-

tesy of Professor Baer and Miss Florence Smith, now head of the department, to both of whom grateful acknowledgement is herewith tendered. I have also to thank Dr. J. D. Shea for valuable suggestions relative to the statistical treatment of the material and Dr. Mary Gould for assistance in transcribing and checking data.

Regional Origin of Students

The students of Newcomb College come principally from Louisiana and the states contiguous to it. Table 1, based on "attendance by states" in the yearly catalogues from 1912 to 1924, inclusive, summarizes the representation of those states and of the city of New Orleans, in the enrollment. The state of Louisiana alone furnishes nearly eighty per cent of the students, about three-fourths of whom are residents of New Orleans. The group of seven contiguous states listed in table 1 provides over ninety-six per cent of the total enrollment.

TABLE 1

Origin of Newcomb Students by Residence, 1912-1924

New Orleans	58.6%	Tennessee	1.5%
Louisiana (outside New Orleans)	20.5%	Georgia	1.1%
Mississippi	7.3%	Arkansas	.7%
Alabama	3.2%	All other sources	3.9%
Texas	3.1%		

The origin of the students according to the location of their homes at the time of college entrance does not exactly show the extent to which the young women truly represent the Gulf Coast region, since, obviously, many families now resident in this vicinity may have moved here during recent years. It was thought desirable to check "origin by residence" with "origin by birth." Miss Rose Beeson has calculated the distribution of 2379 students matriculating from 1909 to 1923 inclusive, according to place of birth, the percentages by states being set forth in table 2. As against origin by

TABLE 2

Origin of 2,379 Newcomb Students by Place of Birth
(College entrants 1909-1923)

Louisiana	59.6%	Alabama	4.7%
Mississippi	12.1%	Tennessee	3.1%
Texas	5.3%	All other sources	15.2%

residence, Louisiana's representation is reduced, while that of Mississippi, and of "all other sources" is increased; but the important fact remains that the great majority of the students are, by birth and parentage, from the Gulf Coast states.

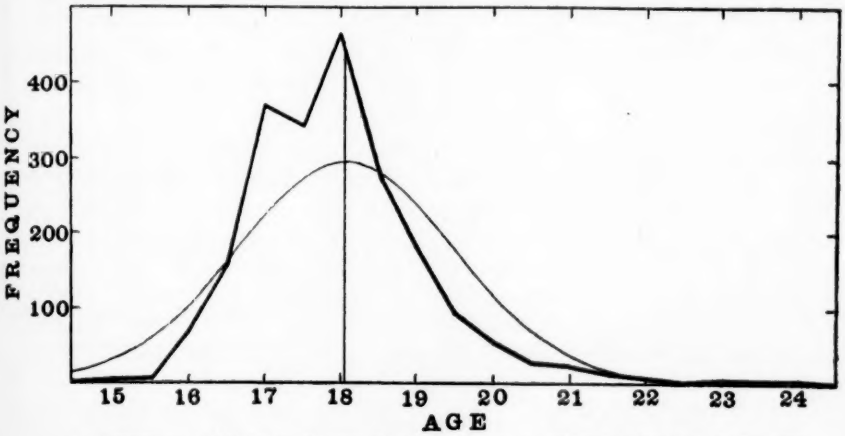
METHODS

All transcriptions of data from the original cards have been checked. All the mathematical operations have been done on a calculating machine and checked either by repetition or by a different method of computation. The frequency curves have been converted

to a standard size by the method of Charlier so that they may be directly compared with one another; most of them are plotted against a normal probability curve. For convenience in reproduction the extreme ends of the curves are in some cases not included in the drawings. As the records were made in English units, the English system has been retained in the calculations.

AGE

The ages of 2110 entering students have been classified to the nearest half-year and the distribution is shown in figure 1. The range is from 14½ to 30½ years with the mode at 18. The mean age is

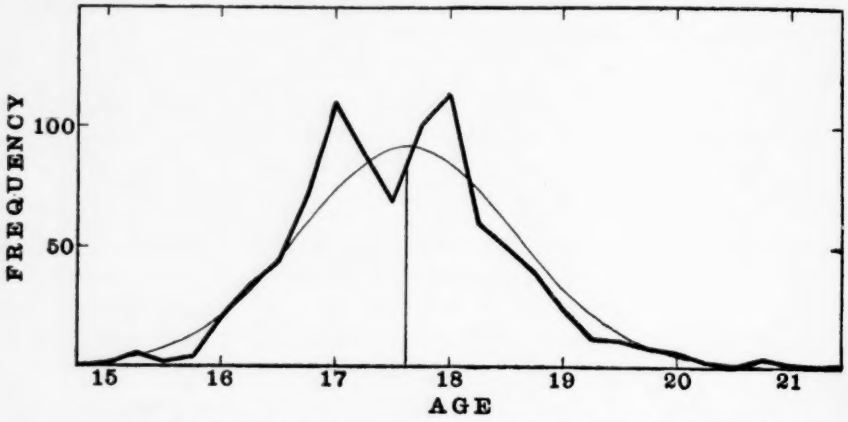


1. Frequency distribution of ages of 2110 students at entrance, classified to the nearest half-year.

18.04 ± .02 years, and the standard deviation 1.43 ± .01 years. In selecting this group all students who entered with advanced standing, as transfers from other colleges, have been discarded. It was not easily possible, however, to eliminate all special students, and those who entered to pursue short courses of study (offered up to the year 1921) not leading to a degree. Short or part-time courses, attracting older women, undoubtedly makes the average age at entrance higher than would be the case if only students entering for the full college course were considered. To obtain an age distribution which would more faithfully represent the dispersion of the typical college group, 887 entrants who afterward remained for the full college course were selected. The distribution of their ages, assorted to the nearest quarter-year, is shown in figure 2. The range is from 14½ to 23 years, the mean is 17.62 ± .02 years and the standard deviation is .96 ± .02 years.

The mean age of college freshmen in the South seems to be considerably below that in most northern colleges reported. Palmer ('29) gives the mean age of 1017 freshmen at Hollins College, Vir-

ginia, 1920 to 1927, inclusive, as seventeen and a fraction years. On the other hand, the age of 1022 women matriculating at the University of Minnesota in 1925 averages, according to Jackson ('29) 19.6 years. In comparing physical measurements of college women it is



2. Frequency distribution of ages at entrance of 887 students who attended for four years.

important to note that the students at Hollins and Newcomb Colleges are a full two years younger than the women at Minnesota, for instance. The measurements of the juniors at Newcomb, given in this paper, are, so far as age is concerned, more directly comparable with those of freshmen in many northern colleges than are the figures for the Newcomb students at entrance.

Figure 2 also brings out the fact that there is an excess of girls who are, at the time of their first physical examination (October or November) close to an even 17 or 18 years old, and that there is a deficiency of those who are about 17½ years old. Outside this range of ages the numbers of individuals are too small to be significant. Apparently more of the group were born during the fall than would be expected if the monthly birth rate were constant. Local birth statistics are not available for the period of twenty to forty years ago, but at the present time the greatest number of births seem to occur in the early autumn, particularly August and September (Biennial Report of the Board of Health for the Parish of Orleans and the City of New Orleans, 1925-1926).

STATURE

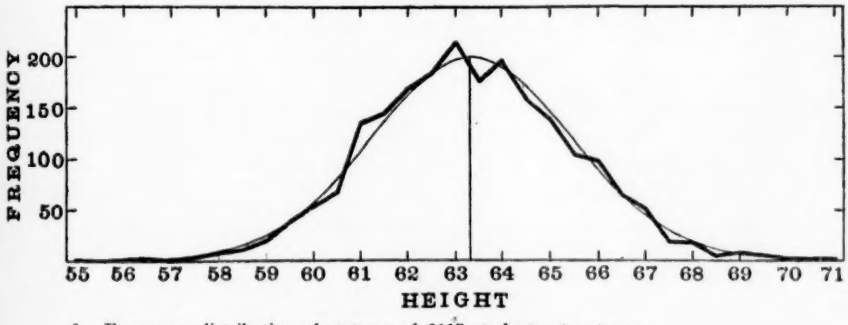
Stature is determined by the use of an anthropometer attached to the weighing scale; a metal rod graduated to eighths of an inch with a sliding horizontal branch. This is probably not so accurate a method as measuring against a scale attached to a vertical wall, but has been employed in the gymnasium because it speeds up the physical examinations, the subjects being weighed and measured without changing

position. During the past year the method was checked by measuring 300 girls, using the method described by Baldwin ('21) and comparing the results with their routine records which were made less than two months previously. No consistent differences were obtained by the two methods.

Two height-measurements are taken as the student stands on the scale without shoes; the height in the standing position habitually assumed, and the height while the subject stands as erect as possible, without touching the vertical rod. Only the latter measurement has been used in this study. Observations are taken to the nearest one-eighth inch, but there is a tendency for the variates to group at the even inch and half inch. Consequently, in assembling them into frequency distributions I have used a class width of one-half inch, taking the even inch and half-inch as class centers.

Stature of Students at Entrance

Stature of the total group. Figure 3 shows the stature distribution of 2117 girls, based on the measurements in the fall of the freshman years, 1909 through 1924. The statures range from 55 to 71 inches. The mean height is 63.31 ± .03 inches, the standard deviation 2.13 ± .02 inches, and the coefficient of variability 3.36 ± .03



3. Frequency distribution of statures of 2117 students at entrance.

per cent. The distribution follows the normal curve quite closely. Since figure 3 was drawn, the mean heights of the freshmen of 1925 through 1928 have been calculated. When these 874 students are added, the total mean height of the 2991 freshmen is 63.34±.03

TABLE 3
Stature of College Women, Comparative

Institution	Years	Authority	Number	Stature (inches)
Vassar	1909 to 1920	Mosher	6,419	63.61
Wellesley	Data published 1927	Turner	1,150	64.13
Hollins	1920 to 1927	Palmer	1,017	63.86
Stanford	1909 to 1920	Mosher	2,180	63.79
Minnesota	1925	Jackson	1,019	63.69
Smith	1909 to 1920	Mosher	6,419	63.61
Newcomb	1909 to 1915	Present data	2,991	63.34
Oberlin	1909 to 1928	Hrdlicka	1,600	63.30

inches, the standard deviation 2.16 ± .02 inches, and the coefficient of variability 3.41 ± .03 per cent. Table 3 shows how the mean height compares with that of other groups of college women of about the same period.

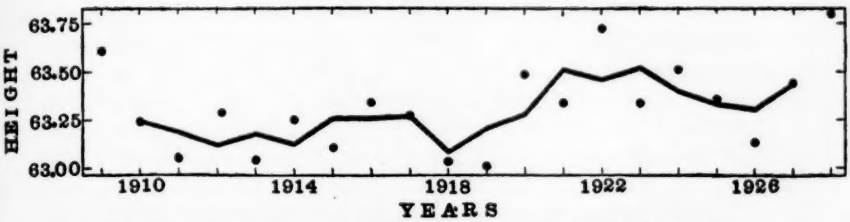
Stature of the successive classes. Evidence has been forthcoming from a number of investigations that the average stature of American youth of both sexes has been increasing during the last forty or fifty years. This is particularly well brought out by Mosher ('23), compiling records of freshmen at Smith and Vassar Colleges and Stanford University. I was interested to see whether the Newcomb data would show any progressive increase during the twenty years covered by the records. Table 4 gives the mean heights of the Newcomb college freshmen classified according to the year of entrance. In

TABLE 4

Stature, Weight, and Body Build of Students at Entrance, 1909 to 1928, Inclusive

Year	Stature		Weight			Weight-Height[2] Index
	Number	Mean Height (inches)	Number	Mean Weight (pounds)	Median Weight (pounds)	
1909	48	63.61 ± .18	48	113.23 ± 1.48	110.7	27.98
1910	64	63.24 ± .18	66	114.85 ± 1.28	116.7	28.72
1911	90	63.06 ± .15	88	119.15 ± 1.37	115.2	29.96
1912	86	63.28 ± .17	86	115.23 ± 1.06	114.8	28.78
1913	111	63.04 ± .14	111	117.48 ± 1.12	115.5	29.56
1914	93	63.25 ± .13	93	118.06 ± 1.20	116.0	29.51
1915	116	63.11 ± .13	113	116.77 ± .90	117.3	29.32
1916	152	63.37 ± .10	152	117.78 ± .89	114.4	29.33
1917	109	63.27 ± .12	109	113.26 ± 1.01	110.7	28.29
1918	93	63.03 ± .16	94	117.34 ± 1.11	115.7	29.53
1919	197	63.01 ± .10	197	116.22 ± .70	114.3	29.27
1920	206	63.48 ± .09	206	117.35 ± .79	115.5	29.12
1921	183	63.33 ± .10	183	115.24 ± .88	113.1	28.73
1922	179	63.72 ± .12	182	118.30 ± .80	116.9	29.14
1923	176	63.33 ± .10	176	116.73 ± .74	115.2	29.10
1924	214	63.51 ± .10	215	116.53 ± .77	115.4	28.89
1925	252	63.35 ± .10	252	116.12 ± .68	114.5	28.93
1926	219	63.13 ± .09	219	114.40 ± .76	112.3	28.71
1927	215	63.43 ± .10	215	114.79 ± .63	114.2	28.53
1928	188	63.79 ± .11	188	116.71 ± .60	116.0	28.68

figure 4 the mean heights for the consecutive years are plotted, together with a weighted, three-year moving average (solid line) to bring out the general trend. The students of the last nine years have as a whole been taller, with a mean height of 63.44 inches, than those of the first eleven years, with a mean height of 63.18 inches. It seems that there has been a slight general increase since about 1920, though the mean for any individual year is of doubtful significance because of the size of the probable error. The varying incidence of extremely tall or short persons affects the means noticeably, a fact illustrated in table 5. In the table, I have shown the incidence of women over 65.5 inches tall and under 61.5 inches tall in a group of three classes with



4. Trend of mean stature of students at entrance, 1909 to 1928, inclusive.

the greatest mean height and in another group of three classes with the shortest mean height. There is a high percentage of very tall persons in the tall classes and a high percentage of very short ones in the classes with a low mean height.

Stature and age. The stature of entering freshmen, grouped according to age, is given in table 6. Ages from 16½ to 19½ only are included, the numbers of students outside these limits being small.

TABLE 5

Proportions of tall and short individuals in the entire group of freshmen and in groups with a high and with a low mean stature

Year of Entrance	Number	Mean Height	Over 65.5 inches		Under 61.5 inches	
			Number	Per cent	Number	Per cent
1909-1928	2,991	63.34	427	14.3	483	16.1
1909 1922	415	63.73	81	19.5	58	14.0
1928 1913 1918	401	63.02	50	12.2	85	21.2
1919						

It is noteworthy that there is no increase of height with age shown in this group. Jackson has made a similar observation on both male and female students of the University of Minnesota, and suggests that the condition is probably due to a selection of the physically better developed for early college entrance.

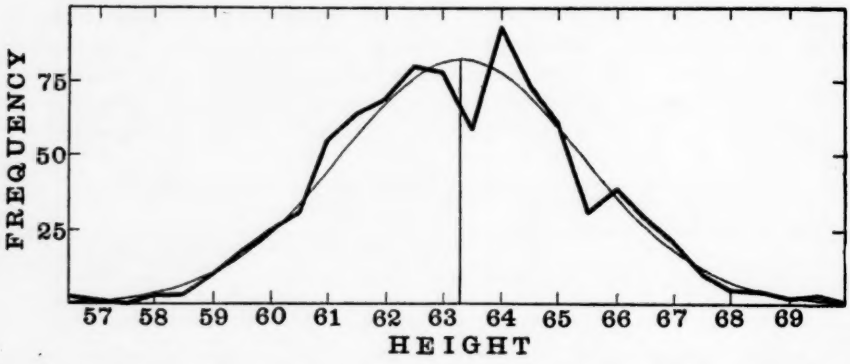
TABLE 6

Stature of students at entrance by ages, classified to the nearest half-year

Age	Number	Mean Height
16½	159	63.37 ± .12
17	380	63.35 ± .07
17½	344	63.35 ± .07
18	449	63.22 ± .07
18½	270	63.23 ± .09
19	179	63.35 ± .12
19½	91	63.26 ± .16

Stature of students native to New Orleans. In Davenport & Love's ('21) Army Anthropology, the mean stature of the first million recruits is stated to be 67.49 inches. When assorted by sections, the tallest men, with the exception of the "mountain whites," are those of the southern white agricultural group, with a mean stature of 68.18. When distributed by states, the southern states in the vicinity of Louisiana have tall men, all means being over 68 inches, but the men of Louisiana average only 67.6 inches. The men of Orleans Parish average only 66.93 inches. The classification by states

does not separate white from colored. The effect of counting in the negroes is probably to bring the stature nearer the total average of the army, since the negroes are neither particularly shorter nor taller than the average. At any rate it appears that there is a concentration of short men in New Orleans, and it was thought it might be interesting to assemble the statures of Newcomb freshmen born in this city. A group of 871 of these have a mean height of 63.29 ± .05 inches and a standard deviation in height of 2.11 ± .03 inches. This does not indicate any significant difference from the student body generally; but the distribution curve, shown in figure 5, exhibits two



5. Frequency distribution of statures at entrance of 871 students native to New Orleans.

modes, one at 62.5 and one at 64 inches, suggesting the possibility of two stature distributions in the group.

Stature Based on a Series of Observations of Each Person

In the preceding calculations, the height of each individual was based on a single measurement, the first. Obviously if it were based on repeated observations it would deserve greater confidence. Now for each Newcomb student who completes the college course there are eight measurements (supposing no physical examination missed); but these eight are distributed over a period of 3½ calendar years, during which time it may by no means be assumed that the height is constant. It does seem worth while, however, to combine the several observations on each person into one figure, which may be called her average height during the four college years.

Accordingly, 981 cases were assembled where at least six measurements (nearly always eight) were recorded, and the mean height determined for each one. The total average is 63.50 ± .04 inches and the standard deviation 2.11 ± .03 inches. This average height is .17 inch greater than the freshman height (63.33) of what is practically the same group (continuous attendants, see below). This is not due to inaccuracy in the freshman measurement, for, as will later be

shown, there appears consistently the tendency to increase in stature during college attendance.

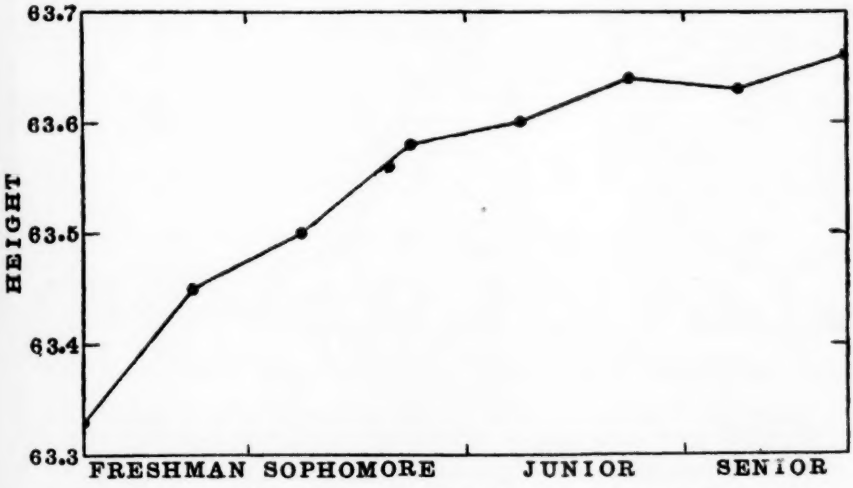
Changes in Stature During College Attendance

It was previously shown (table 6) that when entering students are grouped according to age there is no evidence of increase in stature from 16½ to 19½ years of age. It is obviously incorrect to assume that there is no growth during this period. To work out the actual changes in stature during the years of college life, I have utilized the eight consecutive measurements made at intervals of six months on each person who attends Newcomb for four successive college years and who does not miss any physical examination. 875 cases were available. The mean height of the 875 girls, for each of the eight successive physical examinations, is given in table 7, together with the mean change in stature during each of the seven intervening periods. Figure 6 presents the same data graphically. Evidently we have here almost the top of the curve of growth in stature,

TABLE 7

Successive Mean Statures of 875 Continuous Attendants

Time	Mean Stature (Inches)	Mean Growth during Intervals (Inches)	
Freshman, fall	63.33		
		+ .12	(winter)
Freshman, spring	63.45		
		+ .05	(summer)
Sophomore, fall	63.50		
		+ .08	(winter)
Sophomore, spring	63.58		
		+ .02	(summer)
Junior, fall	63.60		
		+ .04	(winter)
Junior, spring	63.64		
		— .01	(summer)
Senior, fall	63.63		
		+ .03	(winter)
Senior, spring	63.66		

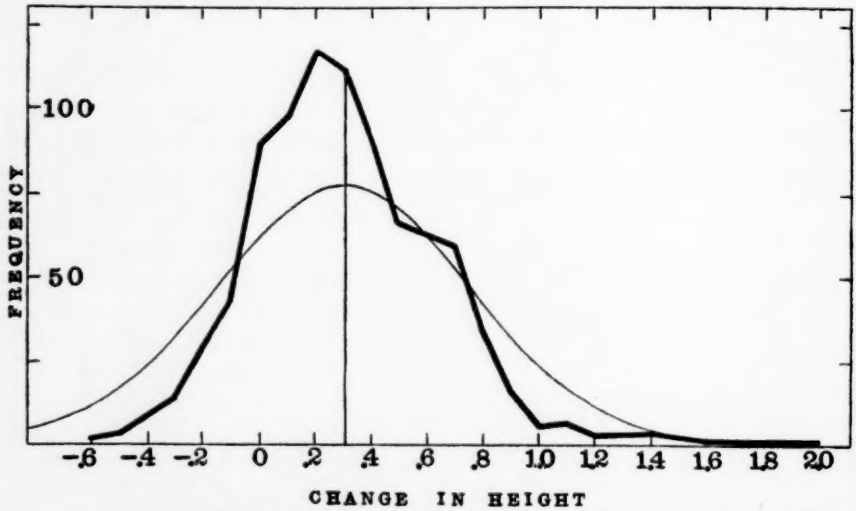


6. Trend of mean stature during college life, in a group of 875 students attending for four years.

the entire mean increase for 3½ calendar years being only .33 inch, of which .27 inch is completed by the spring of the sophomore year.

It will be recalled that this group has a mean age of 17.62 in the fall of the freshman year. By the fall of the junior year it has attained an average age and height approaching those of freshmen in some of the northern colleges cited in table 3. At the time of the last senior physical examination the age would average 21.12 years.

The foregoing generalizations, while indicating the growth in stature of the group as a whole, provide no information regarding what proportion of the individuals are changing in stature, and the extent of the individual changes. This problem has been approached as follows: through the series of eight measurements of each individual student I have passed the best possible straight line, by the method of least squares, using a simple procedure devised by Birge and Shea ('27). This gave, for each person, the approximate change in stature during the entire college attendance, tending to minimize errors of single measurements. Figure 7 is a frequency distribution of the individual changes. For the 867 students included, the mean of the growth increments which have been derived by this method is + .31 ± .01 inch and the standard deviation in growth increment is .45 ± .01 inch. The mean growth increment obtained in this way



7. Frequency distribution of stature-increments of 871 students for the period of college attendance (3½ calendar years).

is close to the figure secured by taking the difference between the means of the first freshman and last senior measurement (.33 inch). In the group under consideration 678 students increased in height, 89 showed no change, and 100 showed diminution in height. It is quite possible that many cases of apparent loss of stature were due to error of measurement or inconstant posture; yet there is evidence that considerable stature may be lost in ill health (cf. Ivanovsky, '23)

and there are well-known small diurnal variations. One can at least say that about 78 per cent of these young women were still growing. The question might be raised as to how much of the increase is due to improvement in posture, but it may be recalled that the measurements used in this investigation are taken after the student has been told to stand as erect as possible.

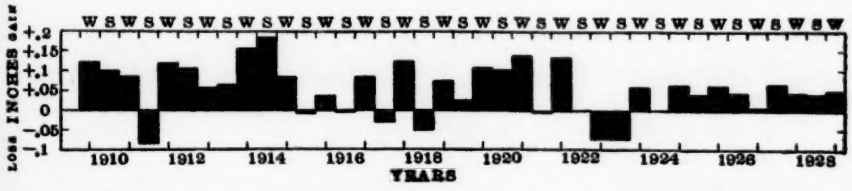
When the students on whom these growth increments have been determined are distributed according to age at entrance, classed to the nearest whole year, and the mean growth increment for each age is obtained, the results are as shown in table 8. For ages below 16 and above 19 the numbers of students are small and not included in the table. The mean growth increment consistently decreases with increasing age at entrance.

TABLE 8

Average Growth in Stature during College Attendance, by Age at Entrance

Age	Number	Increment (inches)	Age	Number	Increment (inches)
16	82	.38	18	327	.29
17	315	.32	19	105	.25

The nature of the records has made it possible to find whether the rate of increase in stature during college residence has been constant throughout the twenty years under consideration, and whether there is any seasonal fluctuation in height. For this purpose figure 8 has been constructed, representing the period between 1909 and 1929. The horizontal distance is divided into segments representing winter and summer intervals, and the mean gain or loss of all "continuous attendants" for each interval is plotted upward or downward, respectively, from the zero line. The number of students concerned varies from interval to interval; each spring one group is removed by graduation, and each fall a new group enters. While there is no constant relation between summer and winter changes in stature, the weighted mean summer growth (based on 3187 individual records for the summer interval) is .0238 inch, and the weighted mean win-



8. Mean summer and winter changes in stature of students, 1909 to 1928, inclusive.

ter growth (based on 4497 records) is .0667 inch, nearly three times as much.[1]

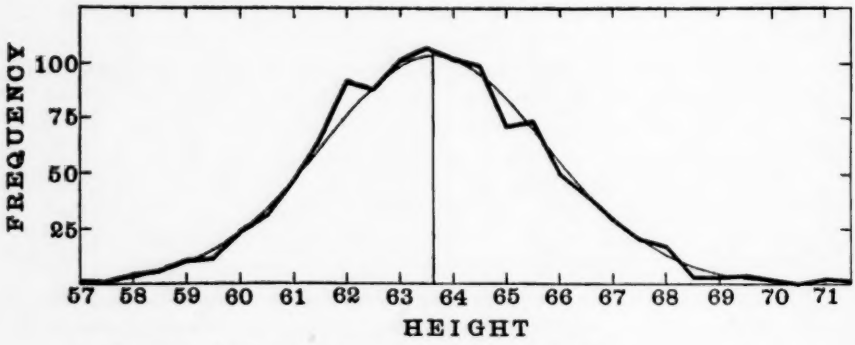
The conspicuous mean loss in height which seems to have occurred

[1] The individual records for the summer and the winter intervals are of course more numerous than the persons involved, since each person, except those near the beginning and the end of the time-series, appears in three summer and four winter intervals.

in certain intervals (figure 8) remains unexplained except possibly for the winter of 1922-3 and the following summer. The bobbing of hair, which, in this region, became suddenly general during this period, is suggested as a possible influence on the height-measurement.

Stature of Seniors

Figure 9 shows the stature distribution of 1103 senior students who were graduated from 1911 to 1928 inclusive. In this case, an average of the two senior height-measurements was used as the height of each individual. The group includes all the 875 continuous attendants (cf. table 7) and, in addition, 228 persons whose records were not continuous, who entered with advanced standing, or who were in their third or fourth year of college when the records were



9. Frequency distribution of statures of 1103 senior students.

begun in 1909. The total mean height is 63.61 ± .04 inches and the standard deviation is 2.13 ± .03 inches.

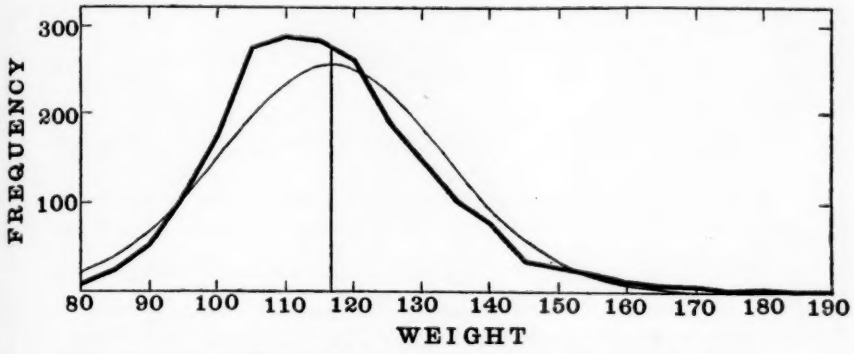
BODY WEIGHT

Body weight is taken, to the nearest quarter-pound, by a beam scale, the clothing being restricted to a light standard garb the weight of which is approximately one pound. In the calculations the weight of this clothing has been ignored, but it should be subtracted from the total averages to obtain the nude weight.

Weight of Students at Entrance

Weight of the total group. Figure 10 gives the frequency distribution in weight, in five pound classes, for 2119 students who entered college from 1909 to 1924, inclusive, at their first physical examination. The mean weight is 116.62 ± .24 lbs. (115.62 lbs. calculated nude weight), the median weight is 114.80 lbs. (113.80 lbs. calculated nude weight), the standard deviation in weight 16.53 ± .17 lbs., and the coefficient of variability 14.2 ± .1 per cent. If the 874 students entering 1925-1928 are added, the mean weight is changed but little, being then 116.22 lbs. The mean weight is significantly less than that of college women of recent years in the northern states. For instance, according to Jacksons ('29) table 3, the mean weight

of 1022 female students at Minnesota is 54.37 kilograms (119.87 lbs.); of 1106 at Wisconsin, 54.98 kilograms (121.21 lbs.); of 430 at Stanford, 54.84 kilograms (120.90 lbs.); and the median weight of 1233 at Vassar is 56.06 kilograms (123.29 lbs.). At the more



10. Frequency distribution of body weights of 2119 students at entrance.

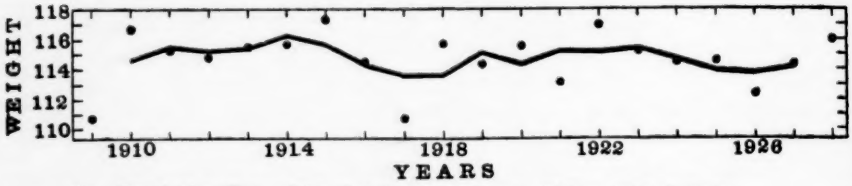
southern Hollins College (Palmer, '29), 1017 freshmen have a mean weight of 115.65 lbs. The foregoing recalls that Davenport and Love ('21) found a relative slenderness in army recruits from the southern states.

Weight of the successive classes. There is considerable interest in the extent to which the figure of the young woman has conformed to the changing ideals of fashion (cf. Mosher, '23 and Palmer, '29), particularly during the last few years. The mean weight, median weight, and mean weight-height[3] index of the successive freshman classes at Newcomb for the twenty years from 1909 to 1928, inclusive, are given in table 4. The median weight is given in addition to the mean, in order to avoid the distortion produced by a few extremely overweight individuals. The trend of median weight and of mean body build are graphically represented in figures 11 and 12 respectively. In each figure a weighted moving three-year average is introduced to emphasize the general trend. There is no very significant change shown in weight alone, but the mean weight-height[3] index, plotted in figure 12, shows a trend toward slenderness, particularly in the last few years. There is less yearly fluctuation in mean body build in the last half of the series, which may be partly due to the greater number of individuals involved.

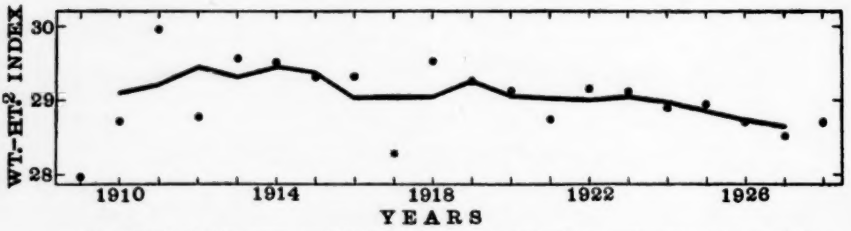
Dr. Palmer has reported an increasing number of "underweight" girls at Hollins College during the years 1920-25. The data on which the present paper is based have not yet been worked over for relative slenderness of individuals. So far as can be seen from the weight-distributions, there is no increase in the number of extremely thin in-

[3] The mean weight-height indices used in table 4 are derived from the means of weight and height for the various classes, and are therefore only approximate.

dividuals in recent years. In the years from 1909 to 1919, inclusive, 9.9 per cent of the entrants weigh less than 100 lbs., and from 1920 to 1928, inclusive, only 8.5 per cent are below that weight; but in the latter period the mean height is slightly greater. The consistent fall



11. Trend of median weight of students at entrance, 1909 to 1928, inclusive.



12. Trend of the mean weight-height index of students at entrance, 1909 to 1928, inclusive.

in the mean weight-height² index from 1922 through 1927 seems to be chiefly due to a slight downward shifting of the entire frequency distribution of weight.

In 1927 and 1928 there has been a marked decrease in variability in weight. The standard deviations in weight for the freshman of these last two years are 13.95 ± .22 lbs. and 12.30 ± .42 lbs. respectively, while the standard deviation in weight for all entrants from 1909 to 1924, inclusive, is 16.53 ± .17 lbs.

Weight and age. When the students from 16 to 19½ years of age are grouped into classes according to age, assigned to the nearest half-year, the mean weights of these classes are as shown in table 9. There are no significant differences among these means, considering the size of the probable errors. Again we have evidence of what is probably a selection of the more robust for early college entrance, since one should expect some increase of weight with advancing age.

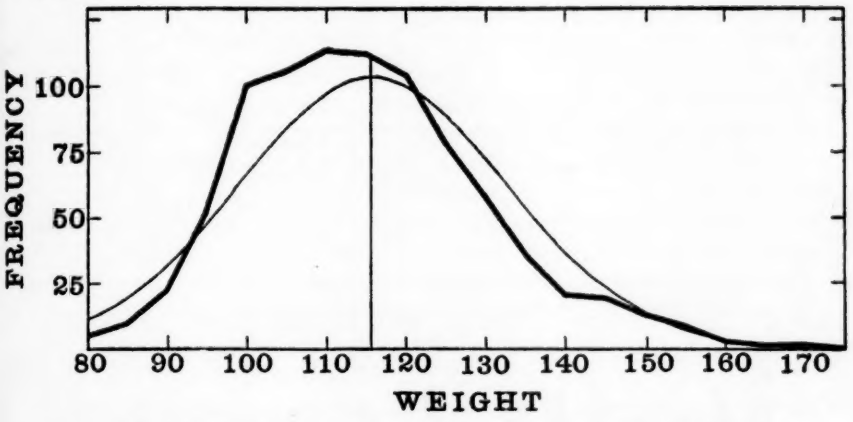
TABLE 9

Body Weight of Students at Entrance by Ages, Classified to the nearest half-year

Age	Number	Mean weight (pounds)	Age	Number	Mean weight (pounds)
16	74	117.03±1.12	18	465	116.78± .51
16½	166	117.47± .93	18½	258	117.52± .72
17	388	116.21± .54	19	180	116.11± .80
17½	335	115.37± .52	19½	80	114.69±1.48

Weight of natives of New Orleans. The average weight, at entrance, of those Newcomb students who were born in the city of New Orleans appears slightly less than that of the total group. In figure 13 the frequency distribution of weights of 871 freshmen native to

this city is plotted. The mean weight is 115.64 ± .38 lbs., and the standard deviation 16.93 ± .27 lbs. The approximate weight-height[3] index of this group, derived from the means of height and weight, is 28.87.



13. Frequency distribution of body weights at entrance of 871 students native to New Orleans.

Changes in Weight During College Attendance

The record of a group of 884 students each having eight consecutive physical examinations were utilized to determine the weight-changes during college attendance. Table 10 and figure 14 show that the mean weight of the group increases but slightly during the four college years. At no time do the students become as heavy as the freshman women at Minnesota, Wisconsin, Stanford or Vassar. Figure 14 shows graphically the interesting fact that there has been a consistent mean gain in weight each summer and a loss each winter,

TABLE 10

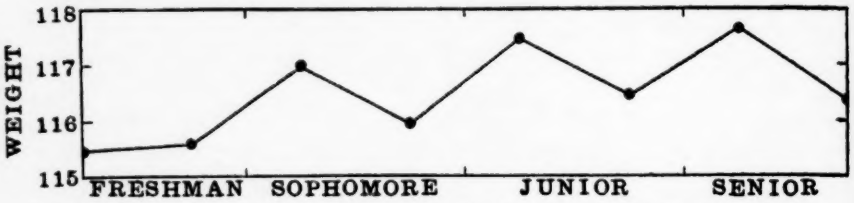
Successive Mean Weights of 884 Continuous Attendants

Time	Mean weight (pounds)	Mean change during intervals (pounds)	
Freshman, fall	115.49		
		+ .11	(winter)
Freshman, spring	115.60		
		+1.39	(summer)
Sophomore, fall	116.99		
		—1.02	(winter)
Sophomore, spring	115.97		
		+1.49	(summer)
Junior, fall	117.46		
		—1.01	(winter)
Junior, spring	116.45		
		+1.21	(summer)
Senior, fall	117.66		
		—1.29	(winter)
Senior, spring	116.37		

except for the winter of the freshman year. During that session there are many striking individual gains and losses but they nearly balance one another.

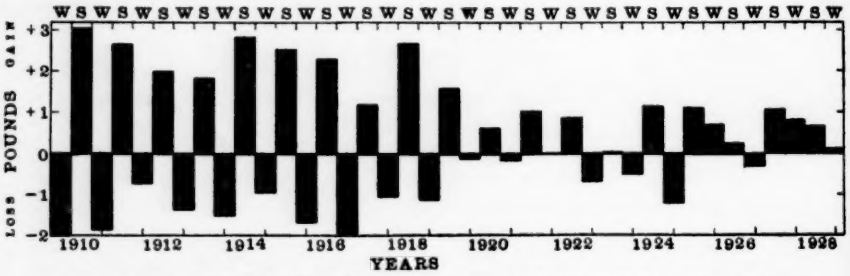
In order to discover whether the seasonal fluctuation in weight has been a constant and regular phenomenon during the twenty years under consideration, I have calculated the mean change in weight of all the "continuous attendants" which could be assembled for each winter and each summer interval during that time. The results are

plotted in figure 15, constructed in the same way as figure 8 for change in stature. It appears that up to 1919-20 the mean yearly



14. Trend of mean weight during college life, in a group of 884 students attending for four years.

fluctuation was quite constant and of considerable extent, often embracing a range of four pounds or more. From 1919-20 to 1924-5 the seasonal changes persisted but the extent of the loss and gain was much less. Since 1924-5 the rhythm seems to have disappeared.



15. Mean summer and winter changes in weight of students, 1909 to 1928, inclusive.

Local opinion differs regarding the cause of these seasonal changes in weight and their reduction in recent years. We cannot point to any specific factors in the physical environment which are known to be responsible for the seasonal rhythm, or that would tend to eliminate it. It seems to be a reasonable assumption that conscious limitation of the diet would more or less stabilize the weight throughout the year and prevent the fluctuation. It is a common belief that such a limitation has, for the last few years, been pretty generally practiced by these young women.

SUMMARY

The present investigation is based on recorded physical measurements of young women at Newcomb College, New Orleans, covering the twenty years from 1909 to 1928, inclusive. The subjects come principally from the Gulf Coast states, especially Louisiana. The average age at entrance 1909 to 1924 is 18.04 years, and the average age at entrance of the group who completed four years of college is 17.62 years.

All heights are measured without shoes, and all weights include about one pound of clothing.

The mean height and weight of all entrants 1909 to 1928, inclusive, is 63.34 inches and 116.22 pounds respectively. The height is less than that of female students of the same period at most northern colleges reported, but when allowance is made for their younger age, the difference is slight. The weight is less than at most northern colleges and the difference is not to be accounted for by the difference in age.

When the students are grouped according to the year of entrance, no very consistent upward or downward trend of height or weight during the twenty years is disclosed. The students of the last nine years average slightly taller than their predecessors. The calculated mean body builds indicate a trend toward slenderness since about 1923.

When the students at entrance are grouped according to their ages, there is no consistent trend of height or weight with age.

Students born in New Orleans are of about the same mean height as other Newcomb freshmen, but the frequency polygon of their heights is bi-modal, suggesting the presence of a taller and a shorter group. Their weight is slightly less than that of the total group but the difference is hardly significant statistically.

During the three and one-half calendar years covered by the records of each student who attends four consecutive sessions, the subjects gain, on the average, about three-tenths of an inch in stature and about nine-tenths of a pound in weight. The increase in stature is on the whole greater during the winter than during the summer. There is a very distinct and consistent mean seasonal change in weight, upward in the summer and downward in the winter. This seasonal rhythm in weight, very marked up to 1919-20, has practically disappeared before 1928.

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ABSTRACT

The physique of women students at Newcomb College of Tulane University. I. Stature and weight. Harley N. Gould, Department of Biology, Newcomb College of Tulane University.

The investigation makes use of twenty years' records of physical measurements taken twice a year on a student population of whom about 80 per cent are from Louisiana. The mean stature of 2991 entering freshmen of the years 1909 to 1928, inclusive, is 63.34 inches and the mean weight of 2993 of them is 116.22 pounds. In the twenty years involved there is no consistent upward or downward trend of freshman height or weight, though the students of the last nine years average slightly taller than those of the first eleven years. Grouped by ages, the entering students fail to show any consistent relation of height or weight with age.

During four college sessions, students increase in height, on the average, three-tenths of an inch, and in weight, nine-tenths of a pound. Height increment is added chiefly in the first two years, and more in winter than in summer. Weight consistently tends to decrease in the winter and increase in the summer throughout the four college years, except for the winter of the freshman year, when the losses and gains nearly balance. Since 1919-20 the seasonal change in weight is much less than in the preceding years. A trend toward slenderness is indicated from 1924 to 1927.

The Efficiency Rating of High School Boys as Shown by the Pulse-ratio Test

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J. S. SKIEN, *Dept. of Physical Education*
State University of Iowa

PERHAPS the greatest problem facing the athletic coach today is the physical fitness of the men with whom he has to deal. There is a vast amount of material available which furnishes what seem to be adequate plans and instructions for reaching and maintaining physical fitness and efficiency; but one often wonders how much of this is based on scientific facts and just what part of it is mere tradition and fancy.

The principal criterion which is used for determining the fitness of athletes is the success of the team of which they are a part. Successful performance is, no doubt, the crucial test of one's ability along any line of endeavor. The difficulty, however, lies in the fact that some who appear fit have defects in physique or technique which can never be corrected, regardless of the care taken in training. The use of such athletes often becomes costly.

For a number of years investigators have experimented with almost all types of measures for determining physical efficiency and athletic ability. There has been without question a degree of success, but one can not find a single test that is generally accepted in the field of athletics as satisfactory for either prognosticating or measuring physical fitness and athletic ability.

An extensive review of the literature dealing with tests for measuring the physical fitness of athletes is omitted since this has been done in detail by Bovard and Cozens.[1]

Practically all methods used, at the present time, for measuring physical fitness and efficiency consist of a battery of tests. This involves highly specialized technique and is very time consuming. In view of this fact it is very desirable to have at hand a simple test easy to apply which gives accurate results. The task of discovering such a test has been undertaken by a number of investigators but especially by Hambly[2] and Hunt.[3] These experimenters selected a group of individuals which represented all degrees of physical fit-

[1] Bovard, J. F. and Cozens, F. W., 1926, Univ. of Oregon Pub.
[2] Hambly, W. D. and others. 1922, Guy's Hospital Report 72, 367. 1925, Guy's Hospital Report 75, 388.
[3] Hunt, G. H. and Pembry, M. S. 1921, Guy's Hospital Report 71, 415.

ness. After applying a number of methods the conclusion is drawn that the pulse-ratio test is the best index to physical fitness.

The pulse-ratio test is particularly attractive in that it is simple to give and consumes very little time. The technique, in general, is of such a nature that it is safe in the hands of those who are not highly trained investigators.

The success reached by Hambly prompted the writers to attempt to apply the pulse-ratio test still further. The results of our efforts are reported in this paper.

The technique which was adopted for securing the data is very similar to that described by Hambly. It consists of having the subject perform a known amount of physical exercise in order to establish a ratio between the resting heart rate and the increase after work. The type of work adopted is stepping on and off a stool 13 inches high for one minute. The pulse-ratio used for comparing one subject with another is the empirical value of 2.5, the basis of comparison being the amount of work prescribed which is necessary to attain this ratio. The strenuousness of the exercise is varied by changing the rate of stepping. The rate of stepping which has been adopted gives a pulse ratio of 2.5. This is determined by dividing the total pulse frequency for two minutes immediately following exercise by the resting pulse for one minute preceding the exercise.

Of course, it would be impractical as well as practically impossible to select a rate of stepping that would give a ratio of 2.5. It is evident, however, that if two rates of work are selected, one giving a ratio above and one below 2.5, one can by plotting steps per minute against the pulse ratios, determine the number of steps required to give the 2.5 ratio; the method used in making this determination is shown in Fig. I. (See pp. 28-33 for tables and figures).

The next step in the procedure is the changing of the data thus collected into percentile rankings and groups. This is done as follows: a number of steps above the limits of our experiment is selected as a standard. In this case it is 80. We are assuming then that a subject who requires 80 steps per minute to attain a pulse ratio of 2.5 is 100 per cent physically fit. This particular figure was adopted because it placed all our values well under 100 per cent. Now, by using the formula

$$\text{per cent efficiency} = \frac{\text{No. steps required for 2.5 ratio} \times 100}{80}$$

a per cent standard of comparison is established. It is, of course, physically impossible for a subject to step on and off a stool 13 inches high at the rate of 80 times per minute. Investigation showed that the most agile could attain a rate of only 60 times per minute.

Data were collected from 76 boys in the University High School at Iowa City, Iowa. The grade range is from 9th to 12th inclusive,

the ages being 12 to 20 years. Each subject came to the laboratory and was given a practice period. Upon another occasion the pulse-ratio test was given and the data recorded. The exercise period of one minute was timed by a stop watch and the number of steps is an actual count. The pulse rate was determined by auscultation. The data were recorded on record sheets designed especially for this purpose.

A Survey of the Physical Efficiency Rating of High School Boys

This experiment includes the entire group which had previously passed the University Entrance Physical Examination. Table I shows that the mean efficiency rating for the entire group is 34.51, with a range of 19-48. The mean standing pulse rate is 79.84 per minute with a range of 60-112.

A few important points in the percentile rankings of the efficiency ratings are as follows:

0	3	10	25	50	75	90	97	100
18.50	20.14	24.80	30.50	34.79	39.25	42.97	45.86	48.50

This means that those receiving a score of 39.25 are better than 75 per cent of the individuals in the group.

Distribution of Subjects Based on Efficiency Ratings. A plotting of the efficiency values presented in Table I gives an approximation of a symmetrical distribution curve, Fig. 2. In order to study this distribution, Table II is presented. The limits adopted are purely empirical and were selected because the data seem to fall naturally into these groups.

It is difficult to give a valuation to each of the groups assigned, but for the sake of discussion it might be said that 3.95 per cent of the subjects were in "excellent" physical condition according to our criterion of judgment; 35.52 per cent were in "above average" condition; 35.52 per cent were in "average" condition; 15.80 per cent were "below average" and 9.21 per cent were in "poor" condition. It is to be understood that the above ratings apply in no way except as indicated in the data presented in this experiment.

Distribution of Subjects on the Basis of Age. Since our group of subjects based on age is heterogenous, they are studied from this standpoint. Some of the age groups are too small to permit generalization. However, each age group appears equally as efficient as the other.

A Comparison of the Pulse-rate and the Efficiency Rating of High School Boys According to Weight. In order to compare the pulse rate and efficiency rating of high school boys according to

weight, the data collected from the twenty-one heaviest (weighing over 140 pounds) are compared with the twenty-four lightest individuals (weighing 120 or less). These data are presented in Table III.

The data indicate that for the groups considered, the heavier individuals have the more rapid pulse, while the lighter have a small advantage in the efficiency rating. The finding with reference to pulse versus weight is somewhat contradictory to what one might expect.

The mean pulse rate for the light individuals is 81.33± .83[4] and for the heavy individuals the mean is 82.57± .91. The observed difference is 1.24± 1.23.[5]

The mean efficiency rating of the light subjects is 34.92±1.06 and for the heavy individuals the mean is 33.05±.86. The observed difference is 1.87±1.37. There are 75 chances in 100 that the pulse rate is higher for the heavy group and 82 chances in 100 that the lighter group shows the higher efficiency.[6]

The Efficiency Rating of Boys Who Smoke. The data in Table I permit the study of a number of special groups. In the survey of personal habits of the boys, it was found that 15 smoke cigarettes. Much speculation and many facts are available concerning the physiological effects of smoking. Although in general, it is conceded by the athletic authorities that smoking is not conducive to good performance, experimental evidence is somewhat contradictory. In order to see how smokers and non-smokers compare, the data collected from the smoking group are presented in Table IV. Because the age range is so small and the efficiency equally distributed among the age groups, this point is disregarded. The data reveal the fact that the mean normal standing pulse of the smokers is 79.20±2.28 per minute as compared with 80.36±.95 for the non-smoking group. The observed difference is 1.16±2.47. The mean efficiency rating of the smokers is 30.73±1.09 and for the non-smokers 35.44±.54. The observed difference is 4.71±1.22, which may be interpreted as 99.5 chances in 100 of a true superiority on the part of the non-smokers.

---

[4] The P. E. of the mean is found by the formula $P.E._{AM} = \frac{.6745 \, \varsigma \, dist.}{\sqrt{N}}$

Probable error formulae should not be used to compare data when less than twenty-five people are included in a group. In this case, they were used for groups of 21 and 24, and in the next analysis (smokers vs. non-smokers) they are used with 15 cases. In both instances, the interpretation should be that there is a distinct tendency toward a universal truth (for groups of this type at least) of the possibility of a true superiority where one is indicated.

[5] The P. E. of the observed difference in means is found by the formula: $P.E._{diff.} = \sqrt{(P.E._{AM_1})^2 + (P.E._{AM_2})^2}$, where $P.E._1$ = the probable error of the first mean and $P.E._2$ the probable error of the second mean. An observed difference is considered statistically significant if it is at least four times its probable error.

[6] The chances in 100 of a true superiority on the part of the value are determined by dividing the observed difference by its P.E. and interpreting the result by means of a table of areas of a probability curve measured in terms of probable errors.

The range of the pulse for smokers is 64-112 per minute and for non-smokers 60-100. The efficiency rating range for smokers is 20-43 and for non-smokers 19-48.

Furthermore, the data show that there are 0 smokers in group 1, 3 in group 2, 6 in group 3, 3 in group 4, and 3 in group 5 (Table II).

The data presented with reference to smoking indicate that there is a slightly lower heart rate and a decidedly lower efficiency on the part of the smokers.

A Comparison of the Efficiency Rating of Athletes with Non-Athletes. Another point of interest which presents itself is that a number of the boys in the group take part in athletic competition during the school year. However, at the time the efficiency test was given, no emphasis had been placed on training. For the purpose of comparing this group with that of those who are uninterested in athletics, Table V has been prepared.

Basketball Athletes. The data reveal the fact that the mean standing pulse of the basketball players is 79[†] per minute, while for the whole group minus the smokers it is 80 and for the group minus the athletes, 79. The mean efficiency rating of the basket ball players is 35, while for the group minus smokers it is 35, and for the group minus the athletes, 34. The observed difference between the mean pulse rate of the basket ball players and the group minus the smokers is 1; between basket ball players and the group minus athletes, 0.

The observed difference between the mean efficiency rating of basket ball players and the group minus smokers is 0; between basket ball players and the group minus athletes, 1. The pulse range for the basket ball players is 66-96 per minute, for the group minus smokers, 60-100, and for the group minus athletes, 60-112. Two basketball players are found in group 1, one in group 2, three in group 3, two in group 4, and one in group 5 (Table II). P.E.'s of means and of differences of means are not included in this and the succeeding paragraphs, as many groups contain considerably less than 25 cases.

Track Athletes. The situation is somewhat different for the track athletes. The mean standing pulse is 83 per minute against 80 for the group minus smokers and 79 for the group minus athletes. The average efficiency rating for track athletes is 38, while for the group minus smokers it is 35 and for the group minus athletes, 34. The observed difference between the mean pulse rate of track athletes and the group minus smokers is 3; between track athletes and the group minus athletes 4. The observed difference between the mean efficiency ratings of track athletes and the group minus smokers is 3; between track athletes and the group minus athletes 4.

[†] Unless there are enough cases used to warrant application of P.E. formulae, means will be rounded to the nearest whole number.

When track athletes are compared with those who smoke, the observed difference is 7. The pulse range for the track athletes is 72-96 per minute, for the group minus smokers 60-100, and for the group minus athletes, 60-112. There are no track athletes in group 1, five in group 2, three in group 3, none in group 4, and none in group 5 (Table II). The data indicate that the basket ball group has no physical advantage over others according to the pulse-ratio test, although the track athletes have a mean efficiency 7 better than smokers, 4 better than the group minus athletes and 3 better than the group minus smokers. The small number of cases involved introduces such a large error of sampling that the observed differences are inconclusive.

The Effect of Exercise on the Heart Rate. It is interesting to compare the effect of light and heavy exercise on the heart rate. For this purpose, Table VI is presented. The data show that in case of light exercise,[8] the group as a whole, the non-smokers, and non-sport students experience an increase of 7 beats per minute. The smokers show an increase of 10 beats per minute, and the athletes only 5. After heavy exercise[9] we find that the increase in pulse rate for non-sport subjects and basketball boys is 31 per minute, for non-smokers 30, for smokers 35, and for track athletes 28. These data show, when compared with the whole group, that the track athletes are at a distinct advantage while the smokers are at a disadvantage.

The Recovery Ability of the Heart. In order to study heart recovery, Table VII is presented. It was found from these data that 59 members of the group returned to normal in one and one-half minutes after the light exercise, while only 18 of the group were normal one and one-half minutes after the heavy exercise. Of this latter number, it was found that 2 are in group 1, 8 in group 2, 5 in group 3, 2 in group 4, and 1 in group 5 (Table II). These data show that 10 of the subjects who returned to normal after heavy exercise are in the high efficiency groups, 5 in the average group, and only 3 in the group of low rating. This indicates a high correlation between the physical efficiency test and the recovery ability of the heart.

The Variability of the Efficiency Rating of Athletes During the Season of Competition. During the season of basket ball competition, while physical training was being stressed, the pulse-ratio test was given to three members of the team at frequent intervals throughout the season. The data are shown in Table VIII. A comparison of the pulse frequency of the athletes before and during the season of competition is as follows: In the case of athlete 1 (Subject 29 in Table I), it was found that before training started the normal standing

[8] Light exercise refers to the work done in producing a pulse-ratio below 2.5. This varies from 15 to 20 steps per minute.

[9] Heavy exercise refers to the work done in producing a pulse-ratio above 2.5. This varies from 30-40 steps per minute.

pulse rate was 72 per minute, while during the season of competition the mean rate was 81. For athlete 2 (Subject 61, Table I), the normal standing pulse rate before training started was 80 per minute, while during competition it was 81. Athlete 3 (Subject 62, Table I), had a normal pulse-rate of 76 before the training season while it was 81 during the competition period. It is evident, therefore, that during the season of competition the pulses of the subjects studied were higher than before training began. This comparison might be criticized on the basis that the pulse after training began is a mean of the season, while the rate considered before the season of competition is a single reading. However, when the data are examined, it is seen that for athlete 1 only one reading was below 72 during the entire season of competition; for athlete 2 only six readings were below 80, and for athlete 3 only three readings were below 76.

When the mean efficiency rating of the athletes on whom frequent readings were taken during the season of competition are compared with their efficiency rating before the season, it is found that the rating of athlete 1 has decreased from 46 to 39, while that of athlete 2 has increased from 31 to 54, and that of athlete 3 from 35 to 47. The data show that in two cases the rating was materially increased and in one case it was decreased during the season of competition.

The data in Table VIII also show the fluctuations in efficiency ratings during a season of competition. Athlete 1 showed a marked decrease in his rating on the day following two of the games; in two cases he showed an improvement. It is seen, however, that on Feb. 8 the initial rating was very low (19), but on Feb. 13 the increase is marked. On each of three days which followed games, athlete 2 showed a marked decrease; in three cases this athlete showed an increase on the day following a game. Athlete 3 showed a marked decrease in six instances on the days following games, while in three cases there was an increase. In case of athlete 1, circumstances were such that it was impossible to give the test after 6 of the 11 games. For subject 2 and 3 the test was necessarily omitted in four and two cases respectively. This necessitates the omission of an important body of data.

There are a number of factors which must be taken into account in making a study of this type: the severity of the game; whether or not it was away from the home court; the amount of available rest; the length of time played, etc. The personal contact of the coach, together with the data presented, indicate that after hard games of competition, there is a loss of efficiency.

The Limitations of the Pulse-ratio Test. An attempt was made to obtain the efficiency rating of athletes immediately following a strenuous exercise such as 32 minutes of basket ball. The test cannot

be done, for the compensatory mechanism is disturbed. One hour after the game the resting pulse is much faster than normal and is very sensitive to any type of stimulation. In the cases examined it was found impossible to get an exercise which would produce a ratio of 2.5, and if projection was then resorted to, the efficiency was unreasonably high, thus making it misleading and unreliable.

The observation made in this investigation shows that the pulse-ratio test must be limited to individuals whose pulse rates fall within the normal range. The nearer the approach of a resting heart to its frequency limit, the more unreliable the test becomes.

The pulse-ratio test is not only advantageous because it is easy to administer but also because of its flexibility. By varying the standard type of exercise it can be applied to almost any sport. This is especially true of gymnastics where standard exercise is easily obtained.

DISCUSSION

The normal pulse-ratio of the trained individuals is materially the same as the untrained. A number of investigators have observed that as a rule, the trained individuals have a lower heart rate.

The group upon which consecutive readings were made showed a variation in their efficiency ratings. This was to be expected since the physiological conditions were constantly altered by exercise and fatigue. It was found, however, that consecutive readings on the same day did give uniform results especially when environmental conditions were fairly uniform.

There is no doubt but that efficiency as rated by the pulse-ratio test may be increased by practice. Although the technique of getting on and off a stool 13 inches high seems rather simple, practice improves one's agility in accomplishing this task. All groups used were given practice before data were recorded.

There is a source of error evident in the pulse-ratio test which must be taken into account. The fundamental basis of the test is work. It is evident, therefore, that the subject who does not step on the stool and assume an erect position is doing less work than the one who does. The position of the arms during the experiment must be considered. They must be kept in a uniform position, preferably stationary at the sides. The data presented in this paper were collected under conditions where all such factors were controlled.

There are so many determining factors which enter into physical efficiency that to say the pulse-ratio test is an absolutely reliable measure would be futile. However, the controlling mechanisms of the heart and circulation are such that variations in practically all physiological factors which might be said to determine efficiency have been proven to be reflected in the compensation of the heart.

CONCLUSIONS

The following are the conclusions drawn from the data presented in this investigation:

1. The mean efficiency rating by the test used in this investigation of 76 high school boys was found to be 34.51, with a range of 19-48.

2. The mean standing pulse rate of 76 high school boys was found to be 79.84 per minute, with a range of 60-112.

3. When classified according to the efficiency rating, the group studied fell into the following divisions:

Group	*Per cent in group*
Excellent	3.95
Above average	35.52
Average	35.52
Below average	15.80
Poor	9.21

4. When compared on the basis of age, it is found that there are no significant differences in efficiency.

5. The data show that there is a slightly higher heart rate and a slightly lower efficiency on the part of the heaviest students as compared to a similar group of the lightest.

6. There is a slightly lower pulse rate and a considerably lower efficiency rating on the part of students who smoke as compared to the ones who do not.

7. The data show a high degree of relationship between the recovery ability of the heart and the efficiency rating.

8. The data with reference to the variability of the efficiency rating of athletes during the season of competition show that:

   a. The normal standing pulse rate was higher during the season of competition than before.

   b. The efficiency rating of athletes during the season of competition is materially increased.

   c. The most common occurrence is a fall in the rating after athletic competition. There are a number of factors, such as the severity of the game, whether at home or away, amount of available rest, etc., which must be considered.

9. The pulse-ratio test must be limited to individuals with a pulse rate well within the normal range.

TABLE I

The Efficiency Rating of High School Boys as Shown by the Pulse-Ratio Test

Subject number	Normal standing pulse	Steps required for 2.5	Efficiency rating	Subject number	Normal standing pulse	Steps required for 2.5	Efficiency rating
2	84	25	31	40	80	35	44
3	72	16	20	41	84	17	21
4	80	25	31	42	92	34	43
5	100	27	34	43	76	34	43
6	80	30	38	44	68	29	36
7	96	33	41	45	88	33	41
8	112	31	39	46	76	23	29
9	100	31	39	47	92	28	35
10	72	31	39	48	92	32	40
11	72	20	25	49	76	22	28
12	100	30	38	50	80	27	34
13	100	19	24	51	88	26	33
14	80	30	38	52	88	27	34
15	104	21	26	53	100	25	31
16	88	33	41	54	72	23	29
17	80	30	38	55	96	37	46
18	84	31	39	56	76	27	34
19	68	31	39	57	62	35	44
20	80	23	28	58	68	33	41
21	64	28	35	59	72	30	38
22	72	27	34	60	64	19	24
23	72	27	34	61	80	25	31
24	88	31	39	62	76	28	35
25	72	34	43	63	86	31	39
26	76	31	39	64	72	24	30
27	68	25	31	65	76	24	30
28	68	28	35	66	78	32	40
29	72	37	46	67	60	28	35
30	92	20	25	68	68	25	31
31	84	35	44	69	62	15	19
32	70	38	48	70	66	19	24
33	72	29	36	71	72	23	29
34	86	32	40	72	88	28	35
35	88	28	35	73	66	23	29
36	72	26	33	74	60	29	36
37	80	24	30	75	88	25	31
38	80	26	33	76	76	16	20
39	84	25	31	77	92	33	42
	Mean				79.84	34.51	
	Range				60-112	19-48	

TABLE II

An Empirical Distribution of High School Boys According to their Efficiency Ratings

Group	Range of efficiency ratings	Per cent in the group	Number of subjects
1	45-50	3.95	3
2	38-44	35.52	27
3	31-37	35.52	27
4	25-30	15.80	12
5	Below 25	9.21	7
	Total	100.00	76

TABLE III

The Pulse-rates Versus Efficiency Ratings of High School Boys of Different Weight

Light Weight			Heavy Weight		
Lbs.	Normal standing pulse min.	Efficiency rating	Lbs.	Normal standing pulse min.	Efficiency rating
88	84	31	154	80	31
110	72	20	168	112	39
117	100	34	145	100	39
110	80	38	145	72	39
105	72	25	175	88	39
107	104	26	145	68	35
140	88	41	150	86	40
95	76	39	168	80	30
110	92	25	194	80	33
122	84	44	145	84	21
110	70	48	181	92	35
90	72	33	170	92	40
107	84	31	142	88	34
100	80	44	142	100	31
108	88	41	150	72	38
100	76	29	152	64	24
120	96	46	146	80	31
108	76	34	150	60	35
98	68	41	150	72	29
115	76	35	168	88	31
106	86	39	150	76	20
85	78	40			
100	62	19			
100	88	35			
Mean	81.33	34.92		82.57	33.05

TABLE IV

The Efficiency Rating of High School Boys Who Smoke

Subject number	Age years	Normal standing pulse min.	Steps required for 2.5	Efficiency rating
8	20	112	31	39
15	15	104	21	26
17	17	80	30	38
20	18	80	23	28
22	16	72	27	34
25	15	72	34	43
27	17	68	25	31
28	19	68	28	35
41	16	84	17	21
54	18	72	23	29
60	16	64	19	24
61	15	80	25	31
68	16	68	25	31
75	18	88	25	31
76	17	76	16	20
Mean		79.20		30.73

TABLE V

The Efficiency Rating of Athletes Before the Season of Competition

Sport	Subject number	Normal standing pulse min.	Efficiency rating
Basketball	29	72	46
	47	92	35
	55	96	46
	59	72	38
	70	66	24
	49	76	28
	52	88	34
	61	80	31
	71	72	29
Mean		79	35
Track	10	72	39
	43	76	43
	44	68	36
	45	88	41
	48	92	40
	7	96	41
	39	84	31
	51	88	33
Mean		83	38

TABLE VI

A Comparison of the Pulse-rate of Athletes, Non-Athletes, and Smokers Before the Season of Competition

Group	Number of subject	Normal standing pulse min.	Pulse after light exercise	Pulse after heavy min. exercise	Increase due to light exercise	Increase due to heavy exercise
All subjects	76	80	87	111	7	30
Smokers	15	79	89	114	10	35
Non-smokers	61	80	87	110	7	30
Basket ball players	9	79	87	110	8	31
Track athletes	8	83	88	111	5	28
No sport	59	80	87	111	7	31

TABLE VII

This Table Shows the Subjects Who Returned to Normal in One and One-Half Minutes After Light and Heavy Exercises. Those Marked + Were Normal; Those Marked — Were Not.

Subject	Light	Heavy	Subject	Light	Heavy	Subject	Light	Heavy
4	+	—	32	+	+	57	+	+
7	+	—	33	+	—	58	+	—
9	+	—	34	+	—	59	+	—
10	+	—	35	+	—	60	+	—
11	+	+	36	+	—	62	+	—
14	+	+	38	+	—	63	+	+
16	+	—	40	+	—	64	+	—
17	+	—	42	+	—	65	+	—
18	+	+	43	+	+	66	+	+
19	+	+	44	+	—	67	+	+
20	+	—	45	+	—	68	+	—
21	+	+	46	+	—	69	+	—
22	+	—	47	+	—	70	+	+
23	+	—	48	+	—	71	+	—
25	+	—	49	+	—	72	+	—
26	+	+	51	+	—	73	+	—
27	+	—	52	+	—	74	+	+
28	+	+	54	+	+	75	+	—
29	+	+	55	+	—	77	+	—
31	+	—	56	+	—			

TABLE VIII

The Efficiency Rating of Three Trained Athletes During the Season of Competition

Date	Game	Normal standing pulse rate			Efficiency Rating		
		Athlete 1	Athlete 2	Athlete 3	Athlete 1	Athlete 2	Athlete 3
Jan.	9—W. L.	80	80	72	46	70	56
	10	..	68	76	..	58	54
	18—M.	80	78	92	49	100	65
	19	..	..	84	..	..	39
	21	80	84	80	54	54	43
	22—I. C.	82	92	80	50	106	46
	23	..	80	92	..	55	63
	25—S. L.	80	84	76	56	66	56
	28	80	84	76	44	38	35
	29—K	84	84	76	38	46	55
	30	76	80	84	31	48	49
	31	84	80	80	40	54	50
Feb.	1	72	76	76	35	50	46
	4	96	80	84	50	56	40
	5—M.	..	..	88	..	..	44
	6	80	76	80	40	38	66
	7	80	86	72	24	49	31
	8—W. L.	64	80	82	19	..	45
	11	76	80	85	31	31	25
	12—W	80	86	..	23	38	..
	13	76	84	..	35	63	..
	14	84	76	..	39	40	..
	15	84	82	..	35	49	..
	16—K.	..	..	..	..	..	..
	18—I. C.	..	92	64	..	49	25
	19	..	76	88	..	40	48
	20	..	82	96	..	53	63
	21	92	80	80	46	38	46
	22—W	..	..	..	..	..	..
	Mean	81	81	81	39	54	47

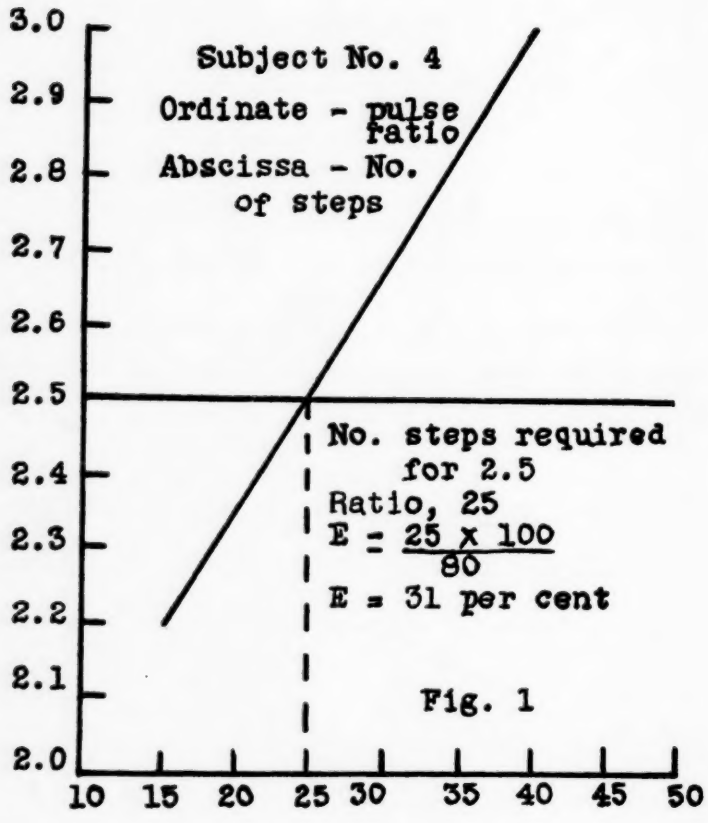
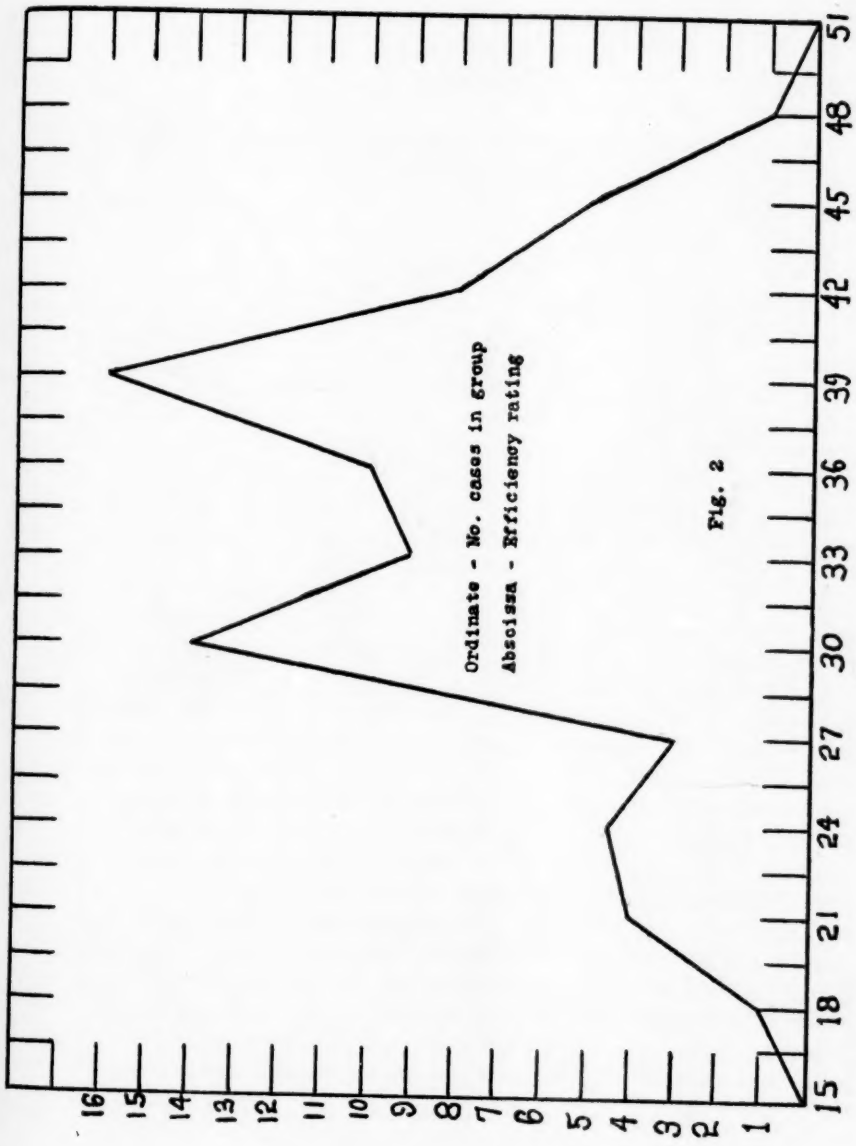

3.0
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.0
Subject No. 4
Ordinate - pulse ratio
Abscissa - No. of steps
No. steps required for 2.5
Ratio, 25
E = 25 x 100 / 80
E = 31 per cent
Fig. 1
10 15 20 25 30 35 40 45 50

FIGURE 1


Ordinate - No. cases in group
Abscissa - Efficiency rating
Fig. 2
1
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48
51

FIGURE 2

A Laboratory for Research in Athletics

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Some of the more obvious psychological problems in athletic competition, such as the processes of acquiring different forms of skill, the effect of the emotions upon performance, and the factors which influence work and efficiency, have merited from the experimental psychologist only sporadic attention. Other problems which are not so obvious, but not on that account unimportant, have been overlooked altogether. One of the first studies in this field, viz., that on football by Patrick[1], was concerned with the entirely different problem of depicting what he declared was the phylogenetic background of football and of some of the other games. More recently there have been an increasing number of occasional studies, such as Cummins' study of the effect of basketball practice on motor reaction, attention, and suggestibility[2], and Noble's study on the acquisition of skill in the throwing of basketball goals[3]. One cannot overlook, of course, that great mass of material which has come from the psychological laboratories regarding learning, skill, motor coordination, reaction time, attention, work and efficiency, and the like, most of which could be duplicated on the athletic field to the advantage of psychology and of athletic coaching; and neither should we overlook the psychological phases of much of the splendid work in the physiology of exercise which has come, for the most part, from the physiological laboratories[4]. Of highest importance in this connection is the recent work of Hill[5]. Then, too, there are the numerous studies that have been made to detect some sort of correlation between mental traits and physical prowess and also the studies on tests of motor skill or motor aptitude[6]. The plain fact remains that the field of athletic competition with all its many problems of psychological and practical import, has remained virtually untouched. We should say, perhaps, that it has remained untouched by the experimental psychologist, for it has long been a fruitful field of report and of anecdote by the professional newspaper reporter, the coach, and the popular psychologist. *Colliers Magazine*, the *Scientific American, Liberty* and to a less extent other popular journals have for a number of years past carried accounts of incidents and upsets

[1] Patrick, G. W. T. The Psychology of Football, Amer. J. Psychol., 14, 375.
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[4] Summarized by McCurdy, J. H. The Physiology of Exercise, 1928.
[5] Hill, W. V., Muscular Efficiency, 1927.
[6] See Freeman, F. H. Mental Tests, 1928.

that are commonly said to be of a psychological nature. Many of these popular articles tell interesting stories about psychological problems, but from the point of view of a science they do not get very far, either in the correct envisagement of the problem or in its solution.

In the fall of 1918, a series of informal observations was begun on some of the psychological factors involved in football and basketball. The first observations had to do with problems of vision and of attention and only a passing notice was taken of those shifting moods and attitudes which go so far toward keeping men on a winning streak or beguiling them into an unexpected defeat. Some of these first observations on vision and attention were checked in the laboratory; but nothing really serious in the form of experimental studies was attempted or even projected. Two years later, this casual interest began to ripen into a more enduring interest and for the first time, to the writer's knowledge, a piece of psychological apparatus was taken to the Illinois Athletic Field. This piece was none other than the Sanborn reaction time outfit[7] and when placed upon a table along the side lines of the gridiron it was made to do good service in the measurement of the reaction time of football players. Some attempt was made to divide men into groups according to their "quickness," but the formal measurements were liberally interpreted and modified by what the coaches already knew of the physical and mental traits of the men under examination. The one fact that appeared independent of these "interpretations" came during the second year, when a rather significant difference in the average reaction time of the men in the two squads seemed to be correlated with a pronounced difference in the success attained during the two seasons. That is, the squad of men with the shorter reaction times seemed to be more successful than did the squad with the longer reaction times. Further studies and observations were made in vision and upon attention, the former with a view to helping men to make a more skillful use of the whole field of vision in sizing up a situation or play, and the latter in selecting those types of formation and shift which offer to the opposing team the most confusing spread of apprehension or span of attention.

Scores of other observations and problems were noted, many of which found their way to the classroom when a special section of the regular introductory course in psychology in which only athletes were registered was organized. The purpose of this section was to teach the facts and principles of introductory psychology by drawing upon athletic competition rather than upon daily life for illustrative material. This special section for athletes seemed to satisfy a real need, and in the fall of 1923 it was supplanted by a totally new course called "Psychology and Athletics." Instead of confining itself to the illustration of psy-

[7] See Titchener, E. B. Experimental Psychology, 1910.

chological facts and principles, by drawing upon athletics instead of upon our everyday manner of living, the new course sought to make a serious psychological analysis of all phases of athletic competition, to review the literature already available which bore upon such problems as skill, learning, habit, attention, vision, emotion, and reaction time, and to gain, wherever possible, such new knowledge as time and the facilities warranted.

It was not long before it became possible to collect in mimeographed form a large amount of such information, and a part of it, after going through three mimeographed revisions, was finally published in regular book form[8]. In the meantime, it appeared advisable to discuss some of the problems already raised from the point of view of coaching methods. That is, there seemed to be a coaching pedagogy which was not quite touched by the standard courses in methods of teaching. The result was a book called the *Psychology of Coaching*[9]. This survey was really a series of observations on the way in which the Illinois coaches went about it to produce their teams.

In the spring of 1925, Mr. George Huff, Director of Physical Welfare for Men, at the University of Illinois, revealed a plan which had been seething in his mind for some time and which called for the establishment and adequate endowment of a laboratory for research in athletics. Mr. Huff had in mind a laboratory which would devote itself to problems in the psychology and physiology of athletic activity quite independently of any attempt to "create bigger and better athletic teams." It was his idea that athletic competition furnished conditions under which certain problems could be worked out in a way that would serve both science and the profession of coaching. It was his belief that greater skill and better mentality in the playing of different games would satisfy the aims of the coaching profession to better advantage than was the case where too much attention was paid to the physical features of competition; but he appeared to be interested also in the contributions that might be made to pure psychological and physiological science. It was his intention that the laboratories should be subventioned so liberally that a program of considerable magnitude might be formulated and carried out. The writer was invited to undertake the establishment of these laboratories and in the fall of 1925 quarters were found in the newly completed Men's Gymnasium and the initial studies begun.[10]

The laboratory for research in athletics occupies two large rooms on the second floor of the new Men's Gymnasium. The one room (550 sq. ft.) is devoted to psychological research, while the other (500 sq. ft.)

[8] Griffith, Coleman R. Psychology and Athletics. Scribners, 1928.

[9] Griffith, Coleman R. Psychology of Coaching. Scribners, 1926.

[10] So far as we have been able to determine, the Illinois laboratory is the second psychological laboratory to be devoted wholly to problems in athletics. There is, at the Coaching School in Berlin, Germany, a psychological laboratory in connection with a half dozen other laboratories and clinics, making this Coaching School one of the best equipped in the world.

is used as a workshop, animal laboratory and physiological laboratory. Several multiple strand cables connect the two rooms with one another so that different parts of the same apparatus may be used independently of one another. Noisy pieces, for example, can be placed in one room and records taken in the other. The rat colony is from the Wistar Institute and is used in experiments upon learning, upon exercise and longevity, and in similar problems.

It is probably fair to say that few other psychological laboratories devoted to a single group of psychological problems are better equipped than this laboratory for research in athletics, thanks to Mr. Huff's breadth of vision and hospitable mind toward research. This apparatus, both that which has been purchased and that which has been created in the laboratory, will be described in a later article.

The laboratory has become a center or a clearing house for at least four different types of investigation and observation. There is, first, the task of gathering records from the different practice fields, compiling these records and interpreting them from the point of view of skill and learning, on the one hand, and of pedagogical practice, on the other. From the basketball floor, for instance, come records as to the number of attempts made at the basket by each man on the squad, the nature of the error, the position from which the shot was made and similar data. This data can be put to immediate use in the sense that the rate of learning of any man can be computed and measures taken to help him increase his rate, typical errors can be described and corrections attempted, and so on. A still more significant use of these records can be made in football, where comparisons of reaction times from year to year offer suggestions as to the fundamental type of strategy that can be attempted in any season. It has been our experience, for example, that the average quickness of a group of men changes from year to year. If a group of linemen is heavy and slow while the backfield candidates are fast, one type of offense is indicated. If the whole team is fast and shifty another type might be attempted. A similar use of such data appears in basketball when a coach is vacillating between the slow and the fast breaking offense. As the writer has tried to show in another place, a group of low average reaction time and alertness learn the fast breaking type of offense only with great difficulty.[11]

The second type of investigation has to do with observations and records of those shifting moods and temperaments of men which do not lend themselves to experiment by the use of apparatus. As every coach knows, there is more to competition than skill and tactics. There are traits of character and of personality and there are all kinds of shifting attitudes and dispositions which can be studied and noted but which cannot

[11] Griffith, C. R. Recent Changes in Basketball Tactics from the point of View of Psychology, Athletic Journal, April, 1929.

be brought into a laboratory or interpreted in terms of numbers. A great deal of time is spent in trying to sense these shifting traits of men, for they must be made familiar to the students in the coaching school who hope to go out and try to understand and control such factors for themselves. It is often said that great coaches are great psychologists. There is a very real sense in which this is true, for great coaches understand more about football than they teach under the topic of "football tactics." They know "human nature," as the saying goes, and it has been the conviction of a great many men that some of this knowledge merits the same attention as does knowledge procured by the mechanical methods of the laboratory. The second problem of the laboratory, then, is to bring to students in the coaching school a psychological analysis of games as they come and go. Throughout the year, in successive seasons, football, basketball, track and baseball are analyzed with the aid of the students in coaching, analyzed not as coaches would analyze them, but as a person interested in confidence, overconfidence, fear, morale, spiritedness, anxiety, moodiness, jauntiness, hunches, and the like, would analyze them. This service of the laboratory is exercized through the special course mentioned above, viz., the course in psychology and athletics.

The third task of the laboratory has been to make a survey of what may be called athletic aptitude or athletic talent. The attempt is being made to work out, for each individual, a profile of his quickness, his powers of attention, his skill at eye-hand coordination, his memory ability, his general alertness, and the like. In a great many of these tests use is made of the general proposition that speed in reaction or in co-ordination may be related to mental ability.[12] In addition to these tests of motor efficiency or capacity, a serious attempt has been made to devise a paper and pencil test of what we have elected to call "athletic alertness." By "athletic alertness" we understand that configuration of motor and mental skill that will help a man in becoming an outstanding athlete. This has meant, of course, a close analysis, from the psychological point of view, of the different sports as they are actually played. It means placing emphasis upon such factors as "heady playing," out-guessing and outwitting an opponent, dodging and pivoting, sizing up a situation, running the open field, meeting new situations, etc. In a subsequent article we shall attempt a description of these tests and measurements together with a statement of the results that have been gained from them. Suffice it now to say that all of this material, when taken in conjunction with observations and judgments by the teachers and coaches who work with the men, is made the starting point for a sort of vocational guidance service among prospective coaches.

The fourth service of the laboratory is to be found in the attempted

[12] See McFarland, R. A. The Role of Speed in Mental Ability. "Psychol. Bull.," 1928, 25, 596-612.

solution of special psychological and physiological problems. In order that this and the preceding services of the laboratory may be adequately performed, considerable money has been spent upon apparatus and other equipment, as we have already seen. This apparatus has allowed each member of the staff of the laboratory to do his own research and it has provided an opportunity for an increasing number of graduate students to do work toward the Master's degree and toward the Doctorate in physical education within the College of Education.

The studies that are now being made in the laboratory cover a wide range of topics. Some of the topics being considered are as follows:

1. Studies on the relation between physical exercise and learning and of the effect of extreme physical exercise on length of life and upon resistance to disease.
2. Studies, in conjunction with the Simmons Fellowship of the Mellon Institute, on the nature of sleep among athletes, with special reference to the effects of exercise during a prolonged season upon resting habits.
3. Studies on the origin and development of timing and pace habits and of the relation of such habits to the so called plateaus of learning.
4. Studies on the effect of nicotine and of other toxins on the learning process.
5. Laboratory and field studies on methods of teaching psychological skills in football.
6. Experimental studies on the fitness or level of condition of basketball players before, during, and after the basketball season.
7. Experimental studies on the nature of foot skills in soccer playing, together with an analysis of the methods of teaching such skills.
8. Photographic and experimental studies of the various types of muscular coordination used in shooting baskets.
9. The effect of fear and of related emotional conditions upon rate of learning and upon the retention of habits.
10. Each fall a complete reaction time study is made of all freshmen coming into the coaching school. Sometimes other tests and measures are made on these men. These measures have become of increasing use in detecting men having marked mental and physical deficiencies. They also furnish the basis of discussion with those men who are interested in a diagnosis of their own strength or weakness. An increasing number of men are making use of the help the laboratory is able to give them.
11. Photographic analysis of types of muscular coordination during fear. This includes: (a) Diving, casting, and tumbling. These studies are leading a way to a better understanding of the meaning of fear among athletes and to better teaching methods where fear is involved. (b) Baseball batting and fielding. (c) Emotional expression and bodily change under extreme fatigue.
12. Studies on the nature of the thinking processes of athletes during actual competition and at crucial moments of decision. It looks as though these studies would throw considerable light on some of our current teaching methods.
13. A study of the persistence of certain types of error in throwing by baseball pitchers together with suggestions for the correction of these errors.
14. Studies on the effects of muscular tension on various skills.
15. An examination of football plays and other types of skill leading to a distinction between physical and tactical skills. An examination of these psychological skills and of the best methods of teaching them.
16. A study of the effect of instruction and of frame of mind upon pole vaulting, broad jumping, and high jumping, together with an analysis of the nature of the decision which leads to action.

17. Studies of the fitness or level of training or fatigue of athletes at different parts of the season, especially in football and basketball. This study is being made in conjunction with psychologists at other universities, and the scope of the study is being rapidly extended.

18. Reaction time and other measures of motor aptitude upon grade school and high school students.

19. Studies on the effect of muscular set on subsequent acts of skill as, for instance, the handling of three bats just before entering the batter's box.

20. Studies on the effect of the emotions on football skill together with a valuation of the ultimate or more remote effects of repeated emotional stress.

21. Visual and postural changes during basketball shooting and their effect upon skill.

22. Sex differences in tests of motor skill.

23. Studies on the effect of different kinds of instruction and of different frames of mind in learning to play golf.

24. Continual observations are being made with respect to teaching and coaching methods in the coaching school.

25. A complete set of instructional films for each of the different sports, including stances, detailed pictures of difficult skills and examples, in actual competition, of good and bad skill. Films already near completion are (a) swimming and diving, (b) batting, (c) high jumping and (d) hurdling. Others are now under way.

In addition to these experimental problems, the laboratory has devised and put into use a variety of tests for certain special skills. Among these may be mentioned (a) a new method and new apparatus for measuring reaction time to muscular load; (b) a test of baseball ingenuity; (c) a test of muscular tension and relaxation, (d) four different tests of fundamental types of serial reaction time; (e) tests for steadiness, muscular coordination, and learning ability; (f) tests for all kinds of reaction time; (g) a paper and pencil test of mental alertness, especially suitable to athletes.

Character Building Through Physical Education*

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PHYSICAL educators have for years claimed to be builders of character. Not infrequently such claims are buttressed by reference to a few students who have engaged in physical education programs and who have changed in the course of a few years from being individuals of rather inconspicuous personality to individuals of outstanding character and ability. The physical educator has been prone to claim the credit for such metamorphoses. Examination of the evidence has not been impressive. The literature is strangely silent with regard to those individuals who took the same courses or belonged to the identical athletic groups but who have changed for the worse.

When one examines the methodology proposed to produce character education through physical education one usually finds such processes based upon faulty psychology and upon methods of education long since abandoned by the leading educational philosophers.

Recent studies by competent investigators[1] have thrown much doubt on the character building efficacy of a number of institutions. When these studies are analyzed and compared with what is known of the learning process the wonder is not that character results have failed to come through either physical education or other such movements but that anyone should have expected such results to be forthcoming when the methods used were not specifically planned to secure changes in character and were not in harmony with sound educational techniques. We have in far too many cases trusted rather blindly to an all-wise Providence and to G. Stanley Hall.

This paper is an attempt to outline a process of character building through physical education, laying down the foundations of the process upon our present-day knowledge of how man learns.

Definitions

Before proceeding to discussion it would perhaps be well to define our terms. The term "character" as used in this paper, is not in any sense limited to the realm of morals. It has been defined by Dewey as

* The writer is indebted to numerous authors in the field of character education. His greatest indebtedness for this paper is to Dr. W. W. Charters from whose book "The Teaching of Ideals" much has been drawn. The principal other sources aside from educational psychology are "Human Nature and Conduct" by Dewey, "Nature of Conduct" by Symonds, the teachings of Professor Judd concerning the importance of verbal responses in transfer of training, and the interpretation of Dewey's philosophy by Professor Kilpatrick. The writer has drawn freely from these sources and wishes to acknowledge his indebtedness.—C. H. McC.

[1] Refer to Bibliography at end of article (p. 59)

the "interpenetration of habits".[2] Dewey, in his book *Human Nature and Conduct,* uses "habits" in the sense of "learnings." This definition may be rephrased as "the interpenetration of learnings." If everyone had read Dewey's book and understood his description of character this definition might be adopted as adequate.

By "interpenetration" we might understand a sort of integration or inter-relatedness, or it might be thought of as a sort of mutual linking up of cause and effect. In Dewey's terminology, "habit" would be anything *learned.* It is not restricted here to habits of action, but means as well habits of thinking, of attitudes, or of emotional states.

The definition which I should like to propose, however, is *the learning basis of conduct,* or *the determiners of conduct.*[3] Let us discuss this definition a moment. A situation arises which calls for choice and the decision must be made as to whether to do A or B. The individual decides to do A. Why did he decide to do A and not B? This decision was based upon certain elements of his heredity but more upon elements of his education. These learnings may have been due to teaching or may have simply been "picked up" from some experience or experiences in the past. It is these determiners of his choice resulting in conduct, these things learned in some way or other, that we should call his "character." These learnings do, indeed, interpenetrate. The physical educator must to a large extent ignore the hereditary bases of conduct, for these are already pre-determined. As an educator he is concerned primarily with what he can do with the individual as he is. This definition of learning would involve all of the social and personal qualities which the individual exhibits in his day by day activities. It includes perseverance, cool headedness, and a general tendency towards initiative as much as it does moral courage and social ethics.

The question may arise as to whether such a definition of character does not assume that desirable changes of conduct (even though they may be the result of quite insincere motives) indicate desirable changes in character. The educator must face this dilemma. He desires to *change* motives but he can not *measure* motives or tell what they are from the individual's conduct. It would, therefore, seem that we are forced into assuming that while with any given individual, improvement in overt conduct may not be accompanied by like improvement in motive, yet general improvement in overt conduct, where such conduct is not unduly influenced by artificialities of the situation such as an over-emphasis upon rewards, is probably accompanied in most cases by improvement in motives.

The Basis of Attack on the Problem

The psychology of physical education is peculiarly poor in scientifically proven results. We have little in this field which gives us a direct approach to character building through physical education. I

have thought, therefore, to approach this problem from the standpoint of a philosophical research. In the last thirty years educational psychology has taken great strides. Much is now known of the original nature of man, of his social inheritance, of the differences between individuals, and of the learning process. It seems rather evident that conduct involving character is just as much related to the processes covered by educational psychology as is the conduct involved in multiplying two numbers together or in reading and comprehending a book.

The individual is undoubtedly as much limited by his innate capacities or incapacities in the character qualities as in those of intellectual endeavor. As we have intellectual morons and geniuses so we have equal extremes in many of the specifically outlined character elements. One may be a genius in certain types of cooperation and a moron in differentiating between some kinds of social and unsocial conduct, just as one can be a genius in mathematics and a total loss in languages.

The social inheritance so ably discussed by writers on educational sociology perhaps applies even more justifiably to the field of conduct in this character realm than to the field of conduct in the classroom. There are individual differences as in that of intellectual endeavor. Some unpublished studies lead to the conclusion that these character qualities are, as is the case of most intellectual and physical qualities, normally distributed, and vary all the way from practically none at all to stages of highest development.

It seems quite evident that learnings in character would be subject to the same laws and principles as learnings in the ordinary intellectual fields; and the commonly taught, and in this day generally understood, laws and principles of the learning process should be applicable here and in almost any other phase of learning. This being true it would seem to me that we might carry over by analogy what we know in the intellectual field into the field of the learning basis of conduct. What remains then is to produce a philosophy of character education which corresponds to an hypothesis in this field. Upon the basis of that hypothesis we can experiment and revise our theory upon the basis of our experience. We must, however, see to it that our educational procedure is purposeful and that we seek directly and specifically to accomplish predetermined objectives. Direct learning, however, will probably be the smallest part of the processes. Associate and concomitant learnings must be as carefully planned for as the direct learnings. Concomitant learnings have in the past been assumed to be what happened that was not planned for. That was, unfortunately, quite frequently true. The capable educator, however, can plan for concomitant learnings as wisely as he plans for his direct learnings.[4]

An understanding of that which follows depends upon a reasonably comprehensive grasp of two things. First, an understanding of the laws and principles of the learning process. In a short treatise such as this, it would be impracticable to present these and to discuss them thoroughly. Ample discussions of these laws of learning will be found in any modern text book on educational psychology.[5]

The second need is an understanding of the general educational principles involved in such processes as the project method of instruction. The differences between the direct, associate, and concomitant learnings, and the use of coercion, as opposed to other forms of motivation. One of the best books for such study is the *Foundations of Method* by Kilpatrick. Other references will be found in the suggested bibliography appended.[6]

Learning is a laboratory process. We have tended to consider the laboratory as the exercising ground of the physicist, the chemist, and the biologist. This is, however, a narrow view. When we learned handwriting, one of our earliest experiences in school, we learned it not by listening to a lecture but by laboriously doing it. We practiced the making of letters; this practice was laboratory work. We learned to read by laboratory work in reading, and we learned arithmetic by the solving of countless problems. For some reason, however, exponents of character education, particularly those representing the church and the Sunday school, have seemed to feel that a peppy exhortation delivered perhaps once a week could take the place of learning by doing. This I believe to be fallacious, and I believe also that we as physical educators must plan our educational curriculum to give a graded laboratory course in character. Each thing should be done for a purpose. This of course raises many problems; for instance, should one emphasize only activities that are of use in later life. I believe that many activities that in themselves are of no use whatever in later life may have extremely great value at one point in the educational process. The average boy who plays football will not play it after he leaves high school or college. Nevertheless, the laboratory training which he gets from participating in games like this may have made playing the game worthwhile. We do not usually continue the study of arithmetic past the grades; we pass on to the study of algebra, to geometry, to trigonometry, and to the calculus. Each in its turn leaves a deposit of use in later life though that use may be an indirect one.

The problem is raised also of the dilemma of "education for later life" versus the philosophy that education *is* life. It would seem to me that both of these can be true and that we as educators can plan an education that is life to the participant today while preparing him also for life later on.

The Character Education Process

The development of such an educational process involves a number of steps and of separate procedures.

The first of these is the determining of the objectives of the individual. Recent studies of the individual objectives of physical education indicate that interests, mind-set, and objectives in general are not the same.[7] Just as tastes in music run from the classics to jazz so do tastes in physical activities run from basketball to calisthenics, from dancing to apparatus work, and from water polo to weight lifting. Some of these interests are probably due to individual differences in innate tendencies. More of them are probably due to differences in local situations and conditions. The director of physical education who ignores these interests and individual objectives, however, loses values inherent in the project approach and sterilizes much of his character building process.

Determine the Objectives of the Individual

One of the best methods of determining such objectives is to prepare a comprehensive check list. We suggest that such check lists be prepared as in the illustration given on the following page with omissions and additions according to the exigencies of the local situation. The check list used will, of course, vary with the group, the season, and the equipment.

After determining these individual likes and dislikes, tabulate them in numbers and by individuals and take them into consideration in the building of the program. It is difficult to give directions for doing this in such a general paper, because of the fact that local equipment, teaching staff, course of study requirements, and other factors render any generalized treatment ineffective. One method of approach that is exceedingly effective with groups from the senior high school ages and up will be given a little later in this paper.

Determine the Teacher's Objectives

The second thing to be taken into consideration is the objectives of the teacher. The director of physical education should know what his character objectives are, what qualities he is seeking to develop, what habits of conduct he wishes to build.

In the development of his list of objectives the practical physical educator as contrasted with the teacher interested in pure psychology is faced with a dilemma. The psychologist of today will tell him that there is no such thing as a generalized trait; that there is no such thing as honesty, as cooperation, or as sportsmanship. He will say that there are hundreds of specific honesties; that one may be scrupulously honest in rendering expense accounts and not be able to count over seven in golf; or that a man may have perfect vision for seeing the mote in his neighbor's eye and be utterly unable to see the beam in his own eye.

If we were to hold to this teaching of the psychologists we should have to produce a list of many hundreds of specific objectives. The practical educator, however, recognizes that this will not do. In the first place man thinks in terms of words and there are no specific words for most of these objectives. One who does not have the word for a quality and can not express himself feels balked. This is seen

"Read the following list of physical education activities and make an X in the columns that represent your feelings or desires:

	Enjoy or would enjoy doing very much	Would like a little but not much	Averse to doing	I should like specific coaching in
Apparatus work				
Archery				
Baseball (indoor)				
Baseball (outdoor)				
Basketball				
Boxing				
Calisthenics				
Diving				
Fencing				
Golf				
Group games				
Gymnastic dancing				
Handball				
Hiking				
Horse shoes				
Indian club swinging				
Life saving				
Marching				
Mat Exercises				
Roller skating				
Rowing				
Running				
Squash				
Swimming				
Tennis				
Track and field				
Volleyball				
Wrestling				

Now look back to the items you checked in the first column and mark the one you like best with a Figure 1, your second choice with a Figure 2, and your third choice with a Figure 3."

perhaps as clearly as any place in the field of esthetics or in love-making. The individual who is moved by great emotions but who can not express himself either in music, in verse, through adequate adjectives, or similar outlets, feels strangely impotent. Professor Judd, I believe, rightly emphasized the importance of words or names in the human learning process.[8] We tend, practically speaking, to put these specific objectives together into bundles. Those that have a number of common elements are, in a way, knotted together and carried by one verbal handle. From this point on I shall use the word "trait" quite unblushingly and here define it as a term which brackets a number of specific habits or action patterns having certain obvious things in common which fall, in general, under one heading and which we

have become accustomed to call by one term. This may be poor psychology but I believe it is good education.

An adequate selection of objectives might be classified in numberless ways. One must remember that the simple listing of objectives has no effect upon the character of the individual. It is equally true, however, that the teacher who does not have in mind the results he is seeking to accomplish is apt to miss his goal. It is, therefore, desirable to list such objectives, to think them through, keep them in mind and from time to time to review them, checking up on one's processes.

A tentative list from which to select objectives is appended herewith. It will be noticed that these objectives are grouped under nine general headings. This grouping is simply to put together types of things that in ordinary human thinking go together. This is purely a matter of convenience to assist the teacher of physical education to keep in mind the goals he seeks. The sub-headings or descriptive words to each general heading are in many cases not mutually exclusive, but are semi-synonymous. My idea being not to set up specific objectives so much as to make the field clear in the mind of the teacher.

A TENTATIVE LIST FROM WHICH TO SELECT CHARACTER OBJECTIVES

I. *Qualities of Leadership*
Inspires respect; can inspire devotion to a cause; has *prestige* with groups; others admire and like him; can discipline others.

II. *Positive, Active Qualities*
Is *decisive,* quick, and aggressive; has *initiative,* resourcefulness, and *courage;* is persistent and *persevering* and never quits; exhibits an abundance of energy and "fight."

III. *Positive Mental Attitudes*
Has *self-confidence,* self-reliance, and morale; feels he has "class"; shows alertness and enthusiasm; has *moral courage* and conviction; no feeling of inferiority; does not alibi.

IV. *Self Control*
Control in confusion-producing circumstances; is *cool-headed;* is controlled under provocation, *controls temper;* does not bully.

V. *Social Cooperation*
Obedient to accepted authority, a *good follower;* a good team worker, a hard worker for the group, unselfish, and will sacrifice his own glory; is *loyal* to his group and institution; *will deny himself* for good of group; knows how to assume his share of responsibility.

VI. *Social Action—Standards of the Gentleman*
Respectful to others, modest, magnanimous (holds no grudges); is cheerful, not grouchy; is courteous, *truthful* and *trustworthy*—a real sportsman. Doesn't alibi.

VII. *Ethical Social Qualities*
Respects rules and officials; plays fairly, and only asks justice; respects property of others.

VIII. *Qualities of Efficiency*
Plans and thinks to the point; is thorough and *dependable;* can follow

directions; *finishes what he starts;* he carries responsibility; is *adaptable;* he recognizes the value of time; tries for high standards.

IX. *Sociability*

A good mixer; friendly, people like him; he likes to be with others and others like to be with him.

In the use of the above list of objectives given, many of them will probably need to be omitted with some groups. The nervous development of the child may not have reached the point that renders some of these objectives possible of accomplishment. Some objectives will have been satisfactorily accomplished almost throughout.

In endeavoring to make this list of objectives function in the thinking processes of the teacher a further process must be encouraged, for which we offer no extended example here because of limitation of space. This process involves the detailed thinking into each of these general terms and developing specific objectives in terms of physical education situations. To illustrate in the matter of self-control, one might think up many specific objectives having to do with control of temper when fouled by an opponent, control of temper when treated unjustly by an official, control of temper when reprimanded by the teacher or when scolded by his playmates, etc. There may be dozens of such specific situations or specific objectives lined up under each of these more generalized terms. I should suggest that where a group of individuals expects to undertake such an experiment the different individuals list such specific objectives in some such ways as Charters has done on page 82 ff.[10] Then let this group get together and combine their lists and think them through. The important thing is not that every teacher shall remember a long list of specific objectives but that having thought them through at least once, he shall recognize situations and opportunities as they arise in order that he may use them for educational ends.

When the teacher determines his objectives it does not mean that he assumes entirely the center of the stage and directs the show. A clever teacher can utilize the project method almost in its extreme form and still not relinquish his guidance of the process. Methods of doing this will be presented below. I should, however, like to stress one point here. The prevailing emphasis upon individual psychology has, in my opinion, led too many of us to neglect the equally applicable teachings of social psychology and of educational sociology. We should not forget that the human animal is a social animal. The larger number of his qualities and virtues are social ones. The laboratory practice in these qualities must be given in social group units. This involves the obligation to utilize natural groupings to the fullest, to utilize the knowledge of how to form such natural groups and to emphasize cooperative planning and projecting.[9]

Developing the Concept, the Ideal and the Habit

The third step[10] in this process based upon a knowledge of the objectives of both student and teacher would seem to be the real beginning of an application to the needs of the individual. Let us assume for the purpose of this paper that we are dealing with individuals who are just making their beginnings in developing certain characteristics and traits. The teacher frequently loses sight of the fact that an idea that is very real to him is perhaps utterly unknown to the individual. Let me illustrate in this paper with but one quality, that of "teamwork." Any other would do as well. The *word* "teamwork" together with its concept may be merely a new noise to the individual in the group even though he may have been engaged in cooperative tasks in the home or school. The first step in this process of application then would be to cause the individual to form the concept or, in popular slang, "to get the idea." Let us consider this process. Kilpatrick[4] has given us an excellent illustration upon which I shall draw, phrasing it in my own words. A little child who has never seen a dog or a picture of a dog and has no notion of what a dog is, sees as his first dog experience one of these small woolly animals that a woman carries in her muff. On asking what that is he is told it is a dog. He examines it with care and decides he knows what a dog is. Perhaps his next experience in dogdom is a Great Dane about the size of a six-month-old calf. On asking what this is he is told that this is a dog also. How confused he must be! But after seeing mastiffs and poodles, greyhounds, airdales, terriers, and collies, eventually it dawns on him what "dog" really means and he "gets" a concept of dogness. It is a kind of ideational Gestalt, and like the old puzzle pictures where we used to try to look for the beautiful lady in the shrubbery we sought and sought in vain until suddenly she sprang at us and after that we could see nothing else in the picture; so when one learns a new concept it is by synthesizing many experiences having in them a common element until we get this ideational pattern.

Remember that the individual does not have the same idea of what these objectives mean as the teacher has. To him a term such as "sportsmanship" may carry no meaning. The teacher will need to attach a name to each situation involving such trait-action as it arises. For example, let us suppose that an individual who has not absorbed the concept of teamwork is in a group of boys playing soccer. Suppose John is constantly trying to "dribble" and loses the ball consistently. The teacher may tell him in the hearing of others that he should not have tried to "dribble" in this way when guarded because "it is poor teamwork." He is told that he should have passed to Will under such and such a circumstance. Probably teamwork to

John will now mean pass the ball to Will. As he passes to Will the next time, perhaps an opponent is standing by Will and secures the ball and the bewildered John is now told that it was not good teamwork to pass to Will, that he should have passed to James; *that* would have been good teamwork under these circumstances. At first he is as confused as the baby with the dogs, but eventually as enough situations arise having in them this common element of cooperation and teamwork, it dawns upon John what "teamwork" is. Perhaps, he could give a fair definition of it in his own terms. In such ways as this, different situations are utilized to impress upon the consciousness of the individual what this thing means; to convey to him the ideational pattern that goes with a relatively complex concept. In the terms of the current educational psychology one wants to use the principle of analogy and the principle of partial activity to cause those propotent elements of the situations to stand out and to be associated with satisfactions in such a way as to cause them to become active connections in his mental functioning.

The question will arise, does not this sort of thing happen to the individual in any case? Does he not generalize from his experiences and has he not been having this sort of experience all his life? The difference it would seem to me lies in that while he has undoubtedly been having many experiences yet these have not in most cases been tied up to verbal expressions in the nature of generalizations and intellectualizations but have simply happened as isolated things. It will be the more intelligent individual who will generalize upon the common elements. In the process here outlined the teacher plans to have such generalizations and intellectualizations going forward systematically, pointing towards a desired goal.

The next step, and one which goes on concurrently with the development of the concept, is the forming of the emotional organization or drive centered around the idea so that it becomes a goal to be desired. The teacher, in the process of teaching what the concept is, is at the same time utilizing the laws and principles of learning in such ways as to cause the individuals at the same time or immediately after he forms the concept to decide that it is a desirable type of conduct in which to engage habitually. The next step is that of forming the habit of constantly acting in this way. This, which is the culmination of this educational process, is the forming of ideomotor connections that result in conduct habits.[3] I shall not discuss here the psychology of habit formation for that is discussed in almost any good textbook on psychology.

Expressed in another way these last three elements are habits of thinking, feeling, and acting in the way desired by the educator. Hence, these three elements must all be stressed and inter-related

with the individual as ideo-ideal connections, ideo-motor connections, and ideal-motor connections.

May we stress at this point the fact that such a character education scheme as here proposed will only function where the teacher has his objectives in mind and is constantly endeavoring to utilize situations that arise to mold the concepts, the ideals and the action habits of his pupils. It must be an individual emphasis, not just teaching something to a class. He will have to allow for individual differences in interest, in previous conditioning, and in generally determined mind set. Some individuals learn a thing more quickly than others. Some are easily interested in certain objectives, others are not. The teacher must learn to adapt to these individual differences.

It seems to me wise to call attention at this point to a fact that has been too often overlooked by the educational administrator. The director of physical education, because of the very nature of his athletic situations, has under his control more powerful satisfiers and annoyers than does any other educator. A boy who strikes out at a critical point in the game is vastly more annoyed than when he misses the third problem in arithmetic. He is correspondingly more elated when he knocks a home run than when he solves the problem correctly. The little child is playing with powerful satisfiers and annoyers in a game of tag, and this whole gamut of physical expression lends itself most admirably to conditioning the individual in one way or another. Character education is always taking place. It is the duty of the physical educator to see that the process is moving in the right direction.

One will perhaps not need to warn a teacher of physical education that from the standpoint of the individual participant in a program of physical education the most important thing is the joy of doing, of accomplishing, and the sheer delight of self-expression through skilled activity. The student should not be depressed by the reformer-like emphasis upon some mystical gain. The character education process is a process manipulated by a skilled teacher who sees to it that a favorable educational wind is heading the student's travel in life towards the desired goal. Hence the principal emphasis will be an indirect one.

It is usually held by character educators that the indirect method of instruction should be used almost exclusively although Charters is inclined to question this. In the indirect method the individual is influenced so far as his habits are concerned without realizing that there is any true emphasis upon character traits as such. I hold that this can be somewhat over-done. In the first place certain habits of feeling and acting can be developed in a given environment, which function only in that environment because they are based on nothing

deeper than the seeking of the approval of the teacher or the group. It would seem to me that permanent improvement which would result in transfer will come only when, in addition to a realization of the wider scope of the concept, we have a *conviction* that the behavior pattern in question is a desirable one. As propaganda shows us, much conviction is based simply on reiteration upon the part of "authority." In the interests of the better educational process, however, it would seem that such conviction should be based primarily upon a realization of the social values involved and that some form of a direct approach should be combined with the indirect to produce such a result. No very acceptable method of doing this has come to our attention. A small pamphlet entitled "Character Education on a Practical Basis" by Agness Boysen, published by F. E. Compton and Company is suggestive.

The Process of Transfer[11]

The process given above would be narrowly circumscribed if it went no further. Some method must be found which will cause learnings in the physical education field to have a wider spread of influence. With this end in mind it becomes necessary to devise educational procedures which will capitalize the common elements in the various types of situations covered by the same general trait-name, and to cause the individual to generalize them and, as far as possible, to intellectualize the process; this would seem to be a matter of pointing out such common elements from time to time and of helping the individual to such generalizations and intellectualizations. More important still, I believe, is the need for the cooperation of the whole faculty or staff of an institution in an attempt to integrate into one whole the non-physical and the physical aspects of education. To illustrate, suppose the teacher of physical education were to mimeograph the list of objectives sought for each group during the current period and the types of laboratory experiences used in the seeking, and were to distribute this list to the staff or faculty of the institution explaining it briefly and seeking cooperation. Probably this teacher would have to talk with each faculty member individually. Suppose the class in English is studying Ivanhoe. The English teacher is too prone to forget, just as is the teacher of physical education, that words do not necessarily convey meaning. While the group is studying this classic the teacher of English might kill two birds with one stone by associating certain of the episodes of this story with the words used in connection with the physical education character education process. Certain of the processes of chivalry can be associated with the term "sportsmanship." Some of the episodes of the book exhibit good teamwork. The student is given a richer comprehension of this classic in terms of his own experience,

and the specific learnings which he has developed in the gymnasium or on the athletic field are spread to wider fields.

The teacher of civics has also a rich opportunity to cooperate in this scheme and to secure both an attitude of readiness towards civic cooperation and social ethics and to enlarge the character scope of things learned in physical education. Probably enough has been said to illustrate this process of transfer. An alert teacher working with a cooperative staff in his own and in other departments has, it seems to me, a perfectly obvious possibility of securing these character results. I should like to stress the fact that character building is not confined to physical education. The physical educator should be cooperative in the same way with the character education efforts of other members of the faculty or staff. Because of the specific needs of my subject, however, I am not discussing that phase of the process.

The same process can be carried out by the staff of such social-educational institutions as Y.M.C.A.'s, Y.W.C.A.'s, Boy and Girl Scouts, etc. The staff members, group leaders, and others have equal opportunity to stress this type of transfer of training. Teachers and others who are poorly acquainted with the principles of the transfer of training should refresh their memories by again studying these principles in any modern textbook of educational psychology.[5]

It should be pointed out that in this process the largest contribution made by the physical educator is not that of producing the transfer of training. It is rather that of giving the base upon which transfer can take place. Concepts do not come from an intellectual vacuum. They arise out of previous experiences whether these be physical, intellectual, or emotional. The individual who has experienced things that are significant and meaningful to him and has experienced them in functions of life that do not seem artificial, and in addition has had the common elements in such experiences tied into common bundles with verbal handles, tends the more easily to develop general concepts. The physical educator is working with activities and with experiences that are vital to child life. It is easy for him to develop these concepts, to associate them with ideals and action habits and to lay the ground work upon which transfer can take place. It is essential that this be done systematically and comprehensively.

The physical educator should not go to the other extreme, however, and assume that all responsibility for transfer must be assumed by others. He, himself will frequently be able to call to the attention of the individual student wider applications of the concepts learned in a physical education environment and to assist him to generalize concerning them. The teacher should be alert to seize all such opportunities when it can be done naturally.

Measurement of Results

One of the major obstacles to rapid progress in character education is the difficulty of measurement in this field. Experimental programs, however, necessitate an attempt at measurement. In such cases one usually falls back on ratings. Rating scales have their limitations. Some are more objective than others. A rating scale is appended to this paper. In this scale not all of the items have been checked for validity or reliability. More research will have to be done with such scales before they can be presented as being the best that can be proposed. Pending such research, however, we offer the scale given here without apology.

It will be noted that this scale attempts to rate actions in terms of the frequency with which they are observed. In the item "he hogged the ball," he is rated in terms of "extremely often," "frequently," "fairly often," "seldom," "never." This is rated simply according to the observation of the leader. No attempt is made to determine why he did or did not "hog the ball," but simply that he did or did not do so. As noted in the title, it is a *behavior* rating scale. Some of the items are less objective. They are, as it will be noted, classified under a number of headings, corresponding to the general headings in the list of proposed objectives. The small numbers in the corner of each square are to be used to score the individual. These are purely arbitrary and we have no evidence to show that any one of these items is of equal, greater, or less importance than any other item. These scores are used simply as a matter of convenience and should be written under the word "score."

Each individual in the group should be rated by such teachers of physical education who feel competent to rate him and also by a carefully selected group of student leaders. These are probably the commonly utilized squad leaders. They should not be taken into the confidence of the teacher to the extent of knowing that this is a character education experiment and perhaps in the reproduction of these rating scales any suggestive headings should be left off. The final rating adopted for the individual should be the average between the rating of the leader and the teacher. With, however, due weight being given to the assurance of the leader. That is, one would give less weight to the rating of the individual who marked the column "rater's assurance" as "a mere guess," than he would one who marked "positive assurance." Quite frequently, however, the rater who does not feel competent to rate certain things at any given time may observe the individual involved for several days and rate him then.

This rating should be done as early in the semester or season as the rater feels is practicable from the standpoint of his competence to rate. As soon as the rating is completed another profile chart should be prepared such as that given in the sample appended. In this chart

the average rating under each general heading should be drawn in. Suppose, for example, under "leadership" the average of the three items rates 4.5. Under "active qualities" perhaps the average of the eleven items might be 3.9, etc. The teacher would then use this profile as a guide to the needs of the individual. Thus, one individual may be exceedingly well developed and rate high in "leadership," "positive active qualities," "positive mental attitudes," and "qualities of efficiency," but be relatively low in the others; he may be a poor sportsman, lacking in cooperation and low in self-control. The teacher would then endeavor to utilize this profile just as one uses a diagnostic test to find out what needs to be emphasized for each individual and to endeavor to produce changes for the better. The same ratings will be made upon the same individuals at the end of the experimental period.

The teacher and students making these ratings should be exceedingly careful not to allow their personal desires for the success of the experiment to change the ratings. There is no evidence that this method of approach will be successful. The endeavor of the experimenters should be to find out what the facts are even though they may demonstrate that the method proposed is not a valid one.

Other rating scales which may be used by the classroom teacher and by parents of the same individual will be prepared. These scales will endeavor to rate the same types of quality in other situations. The endeavor being to ascertain whether there is any transfer of training. These ratings should also be made at the beginning and end of the experimental period and the two eventually compared.

GENERAL CONSIDERATIONS

In addition to the above there are a number of rather general items which must be kept in mind. In the first place the teacher must constantly be *seeking* to produce such character changes. This may not always be possible. Teachers frequently have a limited contact with the individual, but such limited contacts should be utilized to the fullest. The attitude of the teacher should be that of the good athletic coach who is constantly seeking specific improvement upon the part of specific individuals and who is not simply broadcasting a certain generalized educational procedure. It needs to be individual emphasis.

One should endeavor to produce such changes as rapidly as possible. Some individuals make rapid character strides in a few weeks. The fact that the average individual proceeds slowly should not deter the teacher from endeavoring to secure rapid strides. It may be more possible than we think.

Emphasize group activities. The largest number of the objectives desired are social ones and practice must be given in social group units. This involves cooperative planning and projecting. Endeavor

to seek the integration of the physical education program with other phases of the individual's experiences. These may be in other social institutions, in the home or elsewhere. The best educational system will utilize the largest proportion of these. Our "teamwork" should not all be on the athletic field.

Selection of Types of Activities

In the development of an activities program the types of activities selected for this character education phase of the program should be such as offers in abundance situations in which choices in line with these objectives occur. Formal calisthenics offers few or no such choices and regardless of its alleged "body building" effects is of little positive value in character education. Games and competitive activities, however, abound in such possibilities and should, we believe, be selected more widely.

A Sample Project Activities Program

A type of activities program applicable to high school and older groups, which has the strength of the project approach is given below. This type of program has come from the experiments of Messrs. Laveaga and Paynter in the Hyde Park Branch of the Y.M.C.A. in Chicago. Adaptations have been made on this general principle.

Begin by ascertaining, as suggested above, individual preferences. In presenting such a questionnaire, however, one needs to be sure that the individuals know what the various items mean. If apparatus work has never been taught, perhaps some demonstrations will be in order. If stunts mean little, the teacher should show what they are before presenting the questionnaire.

When the questionnaires are tabulated the relative numbers of individuals interested in any given type of activity will be known.

The scheme outlined here for a gymnasium class begins with a general warming up of approximately three to five minutes, depending upon the weather and the temperature of the gymnasium. This warming up may be formal or informal. It will perhaps best resemble the type of warming up given to an athletic team. Sometimes a few simple Danish exercises are used together with jogging, to warm and stretch the muscle group and "loosen up."

This should be followed by squad activities, with this exception; that the squad is not a pre-determined squad but one determined by the interest of the time. Suppose in a group of forty, it was found that twelve indicated a preference for apparatus exercises, ten a preference for wrestling, fifteen for tumbling, eighteen for track and field, eight for boxing, twenty for basketball. It will be seen here that there must be many duplications. There may be an elementary and a more advanced squad on the horizontal bar, each with a squad leader;

there may be another squad of wrestlers, one of tumbling, one of field exercise, which might for this one day be the running high jump. There may, also, in one end of the gymnasium be a basketball squad, which in this period will not play the game but will simply be trained or coached in the fundamentals of basketball. Each of these groups would have a squad leader with whom a program will have been outlined. He should be a leader capable of carrying out that particular program assisted from time to time by the instructor. The individuals are permitted to go to any squad they desire and may change squads the next day. The same activities need not be presented day after day but at another time a different track event may be made available, boxing may take the place of wrestling, other apparatus may be used, perhaps volley ball will take the place of basketball, etc. The choice of activities will be determined from time to time by the choices of the individuals. These may be determined by a committee of the class, by the instructor, or by the whole class functioning as a committee. Various devices may be utilized according to the group involved. This phase of the activity may last any place from fifteen minutes to half an hour according to the time available.

The next phase of the activity may well be relatively more formal training in fundamentals in the form of imitative calisthenics. The short space of time usually available makes advisable some more concentrated exercises than are frequently obtained in large classes in games alone. If this form of calisthenics is utilized, training may be given in skills which have already been practised in the "whole" method and are now practiced by the "part" method. This phase of the work may last from five to fifteen minutes.

The next phase may be one of games or athletics in which again there may be a number of groups working. The track enthusiasts may go to the running gallery if such be available. Basket ball might be played crosswise at one end of the floor. The other half of the floor may be used for some other type of activity. It is difficult to generalize because of the widely varying equipments.

Obviously the above is simply one sample of program. In institutions having only half an hour for the actual activities program only parts of this may be used. This sample is given, however, to illustrate the principle of permitting and encouraging the exercise of individual differences of interest rather than making all activities obligatory for everyone.

An Educational Experiment

For such institutions as wish to undertake scientific experimentation in the field of character education, it is suggested that two comparable groups be selected, first equating them by pairing one against the other at the beginning of the semester. In school systems these should be, if possible, of the same grade. Both groups should be rated

at the beginning and at the end of the experimental period, which should be as long as possible. It will frequently be limited in schools to one semester. Where possible, ratings should be given also by classroom teachers and parents.

The group which we shall call the "experimental group" may now be subjected to the type of process herein outlined and every endeavor should be made to secure changes in character in the direction considered by the teachers to be desirable. The other group, which we shall call the "control group" should go on as they have hitherto, with no special emphasis being placed upon character development other than what has already been the practice. The methods should be the same methods as those previously used.

At the end of the experimental period the individuals in each group should be rated in every item on the rating scale. Changes should be noted and distributions made of such changes, whether "positive," "zero," or "negative." This is, the number of changes in each item and of the total score should be recorded.

If this has been done, those teachers and administrative officers interested in the experiment should meet often enough so that thorough consideration can be given to the evaluation of the methods used, to the exchange of experience, to suggestions for the improvement of technique and of the instruments used, and to planning the next year's program.

SUMMARY

This paper has made an attempt to outline a process of seeking specific character developments through planned-for learnings, direct, associate, and concomitant. Beginning with the objectives of the individual, taking into account what satisfies and what annoys him, and how he learns, it proceeds to formulate educational objectives and to specifically build up the requisite concept, emotional organization, and habit patterns, within the activities of the physical education department. It then seeks to formulate a method for securing transfer of training and to devise a rating instrument which will permit of a certain degree of measurement.

This process implies many things too extended to treat in this paper. The content of the program must be such as to lend itself to education of this kind. This content will probably be more natural than traditional. It will be a program more of games and competitive activities than of formal exercises, but it is quite probable that certain types of but semi-natural activities will assume a fairly permanent part in the program.

This program would provide for the integration of the physical education learnings with learnings in other fields, and the integration should be not only in the school system but in all phases of the

individual experience. It may be in the classroom, in a boys' group, Y.M.C.A., a Sunday school, a playground, or in the Scouts, to mention only activities for boys.

The securing of results from such a program would imply in the first place a group of teachers who are trained not only in the techniques of physical education but in the educational theory and in the processes implied. It would further demand that these teachers themselves be possessed in large measure of these character qualities they were endeavoring to inculcate; for the example of the teacher will be one of the strongest elements in the situation. A process of the nature here outlined can only develop to the point of efficacy through intelligently directed, controlled experimentation.

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(See next page for Behavior Rating Scale)

DEPARTMENT OF PHYSICAL EDUCATION

Behavior Rating Scale
(Character Education Study)

Date of Rating.....

Name of person rated.....Grade.....Age.....

In what group..... Institution.....

Physical condition: Excellent.....Good.....Average.....Poor.....Very Poor.....

Physical skills: Excellent.....Good.....Average.....Poor.....Very Poor.....

Attended.....times. Length of membership in organization.....

Name of rater..... Relation to person rated.....

Rater's Assurance 0—a mere guess. 1—slight inclination 2—fair assurance 3—positive assurance	Rater's assurance	Frequency of Observation					Score
		Never	Seldom	Fairly often	Frequently	Extremely often	
LEADERSHIP							
1. Achieves leadership in group		1	2	3	4	5	
2. Advances ideas to which group pays attention....		1	2	3	4	5	
3. Schemes, works underhandedly to get his way..		5	4	3	2	1	
ACTIVE QUALITIES							
4 Attempts to dominate others		1	2	3	4	5	
5. Avoids disagreeable duties through excuses, fake injuries, etc.		5	4	3	2	1	
6. Stands up to heavier opponents; shows courage		1	2	3	4	5	
7. Quits when badly roughed		5	4	3	2	1	
8. Plays a driving, aggressive game		1	2	3	4	5	
9. Gives of his best efforts even when team is losing		1	2	3	4	5	
ATTITUDES							
10. Teases or razzes fellow player who does poorly		5	4	3	2	1	
11. Alibies for mistakes and deficiencies		5	4	3	2	1	
12. Gets by when he can by bluffing		5	4	3	2	1	
13. Complains he is discriminated against		5	4	3	2	1	
14. Is cheerful		1	2	3	4	5	
SELF CONTROL							
15. Controls himself when provoked		1	2	3	4	5	
16. Swears freely		5	4	3	2	1	
17. Fouls purposely		5	4	3	2	1	
18. Plays fair when others foul		1	2	3	4	5	
19. Makes loud-mouthed comments, criticisms, etc.		5	4	3	2	1	
20. Is cool-headed in exciting situations; does not "blow-up."		1	2	3	4	5	

Rater's Assurance 0—a mere guess. 1—slight inclination 2—fair assurance 3—positive assurance	Rater's assurance	Frequency of Observation					
		Never	Seldom	Fairly often	Frequently	Extremely often	Score
COOPERATION							
21. Hogs the ball (or other equipment)		5	4	3	2	1	
22. Plays a team game		1	2	3	4	5	
23. Plays to the gallery		5	4	3	2	1	
24. Disturbs meetings by talking, laughing or roughhouse		5	4	3	2	1	
25. Is cooperatively obedient to accepted authority		1	2	3	4	5	
SPORTSMANSHIP							
26. Acts like a good sport towards opponents		1	2	3	4	5	
27. Razzes, teases or bullies opponents		5	4	3	2	1	
ETHICAL							
28. Takes decisions, wins and losses in good spirit		1	2	3	4	5	
29. Takes advantage of lax officiating		5	4	3	2	1	
30. "Crabs" about officiating		5	4	3	2	1	
EFFICIENCY							
31. Seems willing to merely get by		5	4	3	2	1	
32. Is punctual at meetings, practice and games		1	2	3	4	5	
33. Makes good on promises and responsibilities assumed		1	2	3	4	5	
34. Thinks ahead of the play		1	2	3	4	5	
SOCIABILITY							
35. Shows timidity, hurt feelings, over-sensitiveness		5	4	3	2	1	
36. Makes friendly approach to new members of group		1	2	3	4	5	
37. Is chosen by others of group as a preferred companion in some activity		1	2	3	4	5	

Professional Education of Physical Education Teachers

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Part I

A Critical Study of the Construction of the Professional Physical Education Courses of Study

The last ten years or so have seen a most rapid growth and spread of courses of study preparing men and women teachers of physical education. Curricula of all kinds have been created, installed and put into actual practice. The recent report of the "Committee on the Curriculum of the 139 Institutions Preparing Teachers of Physical Education in the United States, 1929" portrays to us the heterogeneous condition in existence today. Its chief finding seems to be that of pointing out the dire need for a really thorough study of this problem. We still need to find the answer to the question: "What should be included in a professional physical education course of study?" And incidentally, we need also to ask ourselves whether or not the course of study proposed for adoption by the committee is sufficiently sound to warrant our accepting it as a fitting solution to the problem.

Neither of these questions can be answered until we define the meaning of "professional education." Dr. James E. Russell once stated that the first law of all professional education was "to teach whatever was needed in practice, regardless of its simplicity or its complexity" and that this need "must be learned whether it be easy or difficult to do so."[1] Probably few individuals will disagree with this stated aim. And probably fewer will fail to agree that this law applies equally as well to the professional education of physical education teachers as it does to all other professional education.

Actually, that is what all of us have been striving to do whenever we constructed a professional course of study. We have all tried to base our curricula on our conception of the needs of the people in the field. Where we have differed has been in point of disagreement as to the nature of the needs of the practitioner.

[1] Russell, J. E., "Report of the Dean of Teachers College," Teachers College Record, Oct. 1927, Vol. XXIX, No. 1.

Our efforts at the arrival of a true conception of this need have been very meager. Practically no direct attempt has been made to discover this need. Indirect expressions of this have been attempted and are to be seen in the efforts made to construct such courses of study as will meet these needs. In such constructions, whenever a choice had to be made as to what subjects were to be included, it can be assumed that those subjects were chosen which, according to the one doing the constructing, would best fit the students for their later occupation. In other words, making a choice was an expression of what was considered to be the needs of the practitioner, and constructing a course of study was synonomous with deciding what those needs were. It can therefore be said with logic that in studying the various methods employed in the construction of such curricula, we are virtually studying the methods used in the discovery of the needs of the people in the field.

This paper proposes, first, to review the several methods employed in the past in the construction of such courses of study—and in that way to study the techniques used in discovering the needs of those in the field—; and second, to attempt a portrayal of what is needed to be done if we wish to obtain a scientifically derived professional physical education course of study.

No doubt, someone will here wish to ask: "What has studying the method employed in the construction of a course of study to do with judging the worth of that course of study?" and "Is it valid to judge the worth of a course of study by appraising the methods used in its construction?" The first is answered with the reminder that no one definitely knows what the needs are, for no one has made a thoroughly scientific and objective study of them. This, then, robs us of the only criteria by which we dare judge directly the worth of a course of study. There remains to us but one other scientific way of appraising this course of study, and that is by the negative method of judging the technique or tool that was used in the discovery of the practitioner's needs on which the constructed curriculum rests.

This procedure is sound. It rests on the scientific axiom that the results of any inquiry—and indeed of all our knowledge—are conditioned by, and their limits are determined by, the method used in their attaining. In other words, the method employed determines the product that is obtained. This is readily seen when one remembers that a method, a procedure, or a technique, whichever one chooses to call it, is but a tool employed by man in the observation of any phenomena. It is the medium by means of which any event or knowledge is made known to us. Every instrument is not only limited in its scope of work, but the very selection of this implement determines in advance the probable outcomes that will be obtained, for if the tool is an exact tool, its limits are defined.

An illustration may serve well here. If we chose to discover some

knowledge regarding the ether vibrations of ten thousand a second frequency, let us say, we could neither make use of the retina of the eye, nor the telescope, nor the tactile corpuscles of man, for none of them is capable of registering such frequency vibrations. In like manner, the temperature corpuscles of man and the seismograph, because of their limited range of excitation, can make us conscious—and hence can give us knowledge—of only another limited sphere of energy manifestation. More even than that, the use of any one of these methods of obtaining knowledge narrows down our probable range of findings to a known and recognizable limit.

In the field of historical research, employing the apparatus of diplomatics, chronology, paleography, epigraphy, lexicography, internal criticism or what not on the same remain or document, we will receive a different kind of knowledge from each, for the scope of work and the limits of each method are defined. The same may be said of any other media or tool or procedure that man may employ, be it in the field of the physical sciences, the natural sciences, the social sciences or philosophy.[2]

Applying this criterion—that of judging the worth of a product by inspecting the means used in obtaining it—to our problem here, it is seen that a study of the methods used in the construction of the professional physical education course of study can tell us what knowledge can and what knowledge cannot be obtained by the use of such techniques, and also what can reasonably be expected to be their probable outcomes. Stated in form of a question, we must ask ourselves: "Are the methods employed in the past capable of gaining for us the knowledge necessary for the fulfillment of the first law of professional education?"

Up to the present, all professional physical education courses of study were based on personal opinion of what was and what was not needed in practice. Three procedures were used to enlist this opinion for the construction of the curricula. Let us now examine these three methods for their ability to give us the necessary knowledge or truth, and let us see what kind of human evaluations they actually did give us.

The first and probably the oldest method is that of individual authority. This is the method where one hundred opinions will result from one hundred people. It is self-evident that all of these opinions cannot be right. On the other hand, it is perfectly possible that all may be wrong. They all represent cases of guessing and the guessing is highly colored by each individual's past environment, past training, present ideals and present prejudices. In practice, this meant that for every wrong judgment, five to one hundred or so teachers, each year, received the

[2] A good example of this need of establishing the soundness of the method of inquiry before the results of this method can be judged is seen in Professor A. N. Whitehead's opening sentences of his first chapter in "Process and Reality," New York, Macmillan Co., 1929, where he says: "This course of lectures is designed as an essay in Speculative Philosophy. Its first task must be to define 'speculative philosophy,' and to defend it as a method productive of important knowledge."

wrong or inadequate preparation for their life work. This seems to be a sufficiently large waste to demand of us a rejection of this as a method of giving us true light on the subject.

The second method used in discovering what ought to be taught is that of collecting the opinions of a number of the leaders in the field of physical education. As a matter of fact, this method is still accepted as a scientific procedure in some circles. It consists usually of a questionnaire in which opinions are sought and ranked. The opinions of highest rank or of greatest frequency are credited with the greatest worth. This method is the method of the average, using this term in both the statistical sense and in that of meaning mediocrity. The average pools the genius and the moron. It stands to reason that the more opinions sought, the lower must be the level of mediocrity. Mediocrity can scarcely be expected to be profound, particularly as it is invariably guided in its thoughts and actions by past, outworn traditions. As a method for the discovery of truth, and particularly the kind of truth we are seeking, on which is to be based future action, this method is more apt to lead us into stagnant pools than to the fountains of wisdom.

Some people justify this method by saying that it is better than individual authority. This is to be doubted just as it is to be doubted that a mixture of the forty best soups by the forty best chefs in the world will result in the best soup possible. It would have been better for us had the tremendous amount of work and energy that had in the past been expended by some individuals on studies using this method been utilized and directed in the use of a scientific procedure.

By temperament or special capacity, there are three types of individuals in the field of higher education. The researcher deals primarily with ideas and is impelled by the drive to search out truth, usually for the sheer joy of satisfying his curiosity; the teacher deals with the interplay or the connection between the ideas or truths and his students, and is impelled by the drive to humanize and to disseminate the facts discovered by the researcher; the administrator deals largely with individuals and organization and seeks to set up and to keep in constant motion, with as little friction as possible, the machinery which makes it possible for the teacher to teach and the researcher to research.

Each one of the three types performs an indispensable piece of work. Each employs a different kind and not a different degree of intellect. The best administrators, by the very nature of their possessing high administrative capacity, are not given to do original research work. On the other hand, those few who do possess both capacities, or those holding high administrative positions who are inclined to delve into the unknown, are prohibited from devoting time and energy to other than administrative functions, which in most cases is a full-sized job in itself. But whatever the cause, the fact remains that but little contribution to the sum total

of human knowledge has in the past been made by college and university administrators while holding such an office, be they president, dean or department head. Thus depending on such individuals—and a list of leaders has predominantly been composed of such in the past—for a true evaluation of the needs of the practitioner is at best a hazardous adventure.

And still another fallacy can be detected in the method where the results are determined by certain selected leaders. Notice must be taken of the fact that, on the average, those individuals usually conceded to be the leaders in their respective fields, by virtue of holding high administrative office, have more often been the stumbling blocks rather than the progenitors of progress. Consider for a moment those outcasts, Copernicus, Socrates, and many others, and compare their wisdom with those of the then recognized leaders as to the right and wrong of things. Cicero once said that "almost every eminent man of Athens was driven into banishment."[3]

In our own field we need not go back so far to see this point illustrated. Who had the sounder theory twenty or so years ago, Dr. Thomas D. Wood or the recognized leaders of that day? Need we also to be reminded of how Dr. Jesse F. Williams was received by the leaders when he first promulgated the very truths that are now almost universally accepted? Would these two men have been placed on a list of leaders at the time that they pronounced those heretical views?

All this evidence seems to point out that since we cannot rightly tell who the leaders are at any given time; since the recognized leaders, because of their peculiar duties, are either not inclined to or have not the time to devote their energies to the kind of inquiry needed for the solution of our problems; and since the pooling of the opinions, whether of leaders or others, can add not a whit of new wisdom, it would seem that this method of arriving at a satisfactory professional physical education course of study is wholly inadequate and its results, at best, can be but a picture of traditional ideas of the mediocre.

The third method used in obtaining a curriculum for the future teachers of physical education is but newly born, so to speak. It consists of collecting data showing what professional courses of study are actually being given and on the basis of this picture, constructing a model curriculum. Three fallacies are inherent in this method of arriving at sound knowledge. In the first place, it is based on individual authority as expressed by each one of the courses of study. This we have seen is wholly unreliable and wasteful. In the second place, this is nothing more than a pooling of many practices based on individual evaluations, and these frequently handicapped by administrative limitations. This makes of it an even more glaring defect than that of pooling the opinions of many people, for when we get the opinions, we may be getting ideals, but when

[3] Cicero, De Oratore, Book II, Chap. 13-14, Trans. Warson.

we collect information as to the practices, we get warped ideals due to financial, equipment or other handicaps.

In the third place, this method assumes that what is done today should be used as a guide for what should be done in the future. It assumes that the forces that will produce the future will be the same as those that have formed the present. No one who sees this world as a changing world can subscribe to such a doctrine. The future, or the preparation for the future can never be predicted from or based upon one picture of the *status quo*, regardless of how thorough and inclusive such a picture might be. And no amount of data collected by the questionnaire alone can give us insight into the needs of the future. And the preparation of teachers is preparation for the future.

It is clear then that neither the method of individual authority, nor that of pooling opinions of chosen leaders, nor that of pooling the data of existing practices as regards professional courses of study can give us information as to the actual needs of the physical education teachers in the field. And since all professional curricula must be based primarily on the knowledge of such needs, none of these methods is capable of netting us a sound professional physical education course of study.

The method which needs to be used if we are to get true knowledge for this professional curriculum has three aspects. It must, *first*, study the practitioner in the field as to the work demanded of him; as to the equipment and the time allotted to him; and as to his ability and present efficiency in taking full advantage of his materials on hand, meaning the pupils as well as the equipment. This will necessitate the collection of a large mass of material with regard to these three items mentioned. This is clearly one type of descriptive research.

The *second* aspect of this method is a sociological one. It involves studying society and society's institutions in an endeavor to discover its present conditions and in that way its present needs, and its possible future conditions and needs. If ninety per cent of the people of any given geographical area, or political boundary, are required to work twelve to fourteen hours a day at hard manual labor, let us say in way of illustration, surely the physical education of such a people would be, and would need to be, different than, let us say, a society where ninety per cent of the people had a seven hour per day working schedule. In like manner other factors affecting society and its institutions, such as climate, geography, chief occupations, political traditions, social customs or beliefs, etc., would need to be considered. This is again a piece of descriptive research.

The third aspect necessitates determining and defining a philosophy of life, both for the individual and for society, and in their terms a philosophy of physical education. For if physical education is to be an educational means, we must know toward what end this means is to be utilized, and we must use only such subjects and such activities that will best bring about the defined goals. It does not take much thought to see that a

Plato, a Tertullian, a Mussolini and a Dewey would each have a different physical education content--even were they all to know all of the physiological, the psychological, and the sociological facts regarding man—because of their diverse philosophies of life, of society and of physical education. These stated philosophies must be based, first, on the scientifically known facts of the nature of man as an individual as well as a member of society; and secondly, on an ideal for which the individual and society are striving. Such an analysis and later synthesis constitutes a piece of philosophical research.

Professional physical education courses of study will ever differ—and should ever differ, for standardization means death—but they must not differ with regard to the proven nature of man, nor with regard to the needs of the practitioner, as is clearly the case today. Only such differences as are the result of different ideals towards which man as an individual or as part of society is to strive, can and should be tolerated.

The day has arrived in physical education when, following the example set us by other branches of human endeavor, individual and collective opinions regarding such things as the needs of the teachers in the field and an adequate course of study to prepare for this need, must give way to more precise procedures. And in the solution of the problem under discussion, only such a procedure will be sound which takes cognizance of all three aspects of the scientific research described above. Needless to say, this is not a one-man job but a collective and highly socialized one.

Part II

Principles of Professional Education of Physical Education Teachers

We have seen that the primary aim of professional education is to provide the students with the things they will need in their professional practice, and, that as yet, no adequate study has been made to determine scientifically what such a need might be in the field of physical education. Until such an investigation is made, we must needs depend for our professional curricula upon individual opinions based on sound principles. It is the aim of this paper to set forth a few principles underlying a sound professional education for physical education teachers.

Before we can begin to think intelligently of the *professional* education of physical education teachers, we must first gain a full appreciation of what professional education actually is. This can best be obtained by contrasting it with liberal education, for we know realities only by their contrasts.

All individuals who come to us to prepare themselves to become teachers of physical education must be viewed and must be treated in a dual capacity, namely, as consumers and as producers; as individuals who have lives to live and as individuals who have things to do; as personalities who are units and ends in and of themselves and as people who are cogs in a

social machine, tools in the process of social life and movement, and means to some cosmic end. Until this fact is fully recognized, and until such differentiation is clearly made, we cannot hope to appreciate the differences between liberal and professional education, between a cultural and a vocational one. Without understanding their unlike qualities, we cannot have a full meaning of what is meant by professional education, and we cannot properly establish principles for this professional education. We are now ready to ask ourselves: "When is an education a professional one, and when is it a liberal one?" The purposes underlying these kinds of education must now be considered.

The focus of a *liberal* education is on the individual. It aims to saturate him with knowledges that are "good to know" or "good to do" in and for themselves. Through such acquired information, skills and attitudes, it plans to give him an appreciation of the relationship of things in the universe. It aims to enrich his living both at the time of his formal education and in later life. Its goal is to ingrain into "the very marrow of his bones," as it were, a sensitiveness to the many phenomena of the universe which give living a meaning. Its purpose is to aid in the initiation of the individual into the ways of a full and rich life. The emphasis throughout is on what the knowledge *does to* the student.

The focus of a *professional* education is on society and civilization. The individual here is not conceived of as an end in himself, but as an effective means for some social service which may make for the betterment of mankind or which may be a contribution to the sum total of civilization. The emphasis, therefore, is on the subject matter which the novice needs to possess and whose effective use he needs to know for his service to society. Just as a plier is a means to the dentist, so the dentist is a means to society. Just as each problem needs for its solution a different kind of a tool or technique, be it a scissor, a printing press, the knowledge of the laws of learning or the technique of applying a bandage; and just as each tool must be fashioned as to best bring about what is expected of it;—so the individual, viewed as a tool for the fulfillment of a special social task, needs to be shaped according to the contribution he is expected to make. The teachers of physical education have specific responsibilities to society and to civilization, and they must be prepared to fulfill these obligations. It is the purpose of professional education to make of the individual an effective means for the fulfillment of ends outside of and larger than himself. The emphasis throughout is not on what the *knowledge does to the student* but what the *student does with the knowledge,* not on *getting* but on *using* knowledge.

No claim is here made that professional education does not also contribute to one's cultural education. All that man learns tends either to liberalize or to degrade him, just as whatever he acquires through study and experience is an asset in his vocational capital. But a very real difference exists between a liberal and a professional education, and this differ-

ence is revealed in their disparate purposes, as already seen, and in their diverse contents and methods of instruction, which will now be considered.

Up to the present, the content of our professional curriculum has always been thought of and discussed in terms of "subjects." The controversial point has always been as to whether this or that subject should be included or whether this or that subject should be omitted. Having decided as to what subjects constitute this curriculum, the question of how much of each was to be given was then decided upon. The important point to be remembered here is that the foundation stones of our present-day curricula are the "subjects."

Anyone who has had experience in compiling professional curricula data, or who has tried to construct a curriculum from such data, knows that though many institutions are offering what appears to be the same course in anatomy, let us say, they are, in fact, giving widely differentiated courses under that name. It is very evident that the name itself does not specify what specific items are taught under it, nor can we glean from it the information as to whether it is taught as a professional or liberal subject. It is a rather common practice, for instance, to credit the same course, such as chemistry, toward the professional education requirement of one student and toward the liberal education requirement of another student.

Under these circumstances, it seems quite futile to haggle over whether this or that "subject" should be included in a *professional* education course of study for teachers of physical education. It is irrational to use "subjects" as the backbone of our professional education. These "subjects," it must be remembered, are, after all, nothing more than mere bundles or units of "bits of knowledges" arbitrarily grouped together for the conveniences of man's thinking. Defining knowledge as to include thoughts, ideals, skills, techniques and all information of whatever sort of which man is conscious, "bits of knowledges" can be said to be particles of all of these.

No "bit of knowledge" is either liberal or professional *per se*. What makes it one or the other is the use to which it is put, the setting into which it is placed, the other "bits of knowledges" to which its relationship is shown, and the method by which it is presented.[4] When a "bit of knowledge" forms part of a general appreciation of the subject under which it is classed, when its place is shown among the other arts and sciences, when it is related to the cosmos in general and to the universe of man in particular, and when it shows the student his place in these environs, it forms part of a liberal education.

When a "bit of knowledge" forms part of a special technique which that individual is to use in his service to society, it becomes part of a pro-

[4] These "bits of knowledges" are not the only phenomena in life whose nature are determined by their use rather than by their own inner merit. To give but one example, a fact of the past does not become a historical one until it is shown in relationship to other facts of its kind both in space and time, that is, not until it is put to some use.

fessional education. Projected into one kind of an environment, that of general appreciation, it becomes part of a cultural education; projected into another kind of a surrounding, that of use, and it becomes part of a vocational education. The criterion for the professional physical education content is that it be composed of "bits of knowledges," not "subjects," which the student will need in his later professional career. This selection of the needed "bits of knowledges" and the amount of emphasis that is to be placed on each constitutes the major problem of the professional education of our physical education teachers.

Numerous conditions exist which help to determine this professional need. They are reflected in our professional education content and in our curriculum. The length of the curriculum, for instance, is very largely determined by the economic returns—financial as well as in personal satisfaction—that the graduates of our professional schools might expect. This expected economic return, in turn, is largely conditioned by the need and the respect that any given community may feel for physical education. We can "up-grade" our professional education, but it can only be done up to some maximal point, beyond which, because of the lack of an increased scale of economic return, the profession is certain to experience serious consequences due to the loss of many of its best prospects. To lengthen our professional education requirement, we must first raise the scale of return that the students might expect from society.

The curriculum must also be fashioned so as to take into consideration the range of professional service open to its graduates. When the many kinds of physical education positions are analyzed for and grouped according to the various functions which they are expected to perform, it will be found that we have five major kinds of physical education offices. The first is concerned with the teaching of physical education as a liberal subject; the second with the teaching of physical education as a professional subject; the third with the supervision of physical education; the fourth with the administration of physical education; and the fifth with research in physical education. Because they each have a different function to perform, they should each have a different kind of curriculum content. This lack of differentiation, by the way, is the cause of one of our foremost problems with regard to the professional education of our physical education teachers. It shows itself in the lack of properly trained persons to teach physical education in our professional schools as a *professional* subject.

It is sometimes said that teachers of physical education in the elementary, in the junior high, and in the senior high schools have sufficiently different functions to perform to require differentiated curriculum content in their undergraduate schooling. This is to be doubted. They are all teachers of physical education as a cultural subject, they are all teachers of boys and girls, and their common means of instruction are the neuromuscular activities. The bulk of their education, consequently, must be the same. The only possible differentiation may be that of giving the

students the knowledge required for the teaching of but one age level instead of all. It is doubtful whether such specialization is sound and practical for our undergraduates. In general it must be said that no professional school is fulfilling its specific function if it fails to adjust its curriculum to the range of professional service open to its graduates.

The curriculum content of our professional education needs to be flexible. As society changes and as the needs of that society change, so change also the needs of the professional education for physical education teachers. This does not signify that there must be a constant addition and subtraction of "subjects" in the curriculum. It does mean that there must be a continual substitution of the more needed "bits of knowledges" for the less needed ones, and of the newly discovered professional material for that out-dated. Through such a continual revision of the professional education our students will be able to keep pace with this changing world.

Accepting the needs of the practitioner as our guide for the content of our curriculum, we must also accept its corollary, namely, that an undergraduate professional course of study can harbor no "electives" for its students within any one kind of physical education service. The professional material at our disposal, which could be given to the novices in their preparation for their needed functions, far exceeds what we can teach in the limited time at our disposal. And the student must be taught his future needs.

Specialization in any one of the five fields mentioned above, or specialization in physical education for either the grades, the junior high school, the senior high school or the college should be permissible only after the student has had several years of successful experience in professional practice, and only then, when the experience is of the kind that reveals that individual's powers and ambitions. The qualification needed for satisfactory graduate work is not merely that of age, but of the possession of a view of life and an appreciation of the professional responsibility.

The content of a professional physical education, when closely scrutinized, can be seen to be composed of three basic elements. It consists of information that needs to be learned, of skills, techniques and behaviors which need also to be learned; and of the vocational use of the learned information and skills. Learning the principles of mechanics involved in the crouching start of the sprinter illustrates the first element. Learning, by doing, the proper sprinting start illustrates the second element. Teaching others this start, which involves both the other two elements plus a third, illustrates the third element. The building of a curriculum for a real situation and the solving of some actual administrative problem may also serve as illustrations of the third element. All three of these elements need to be included in any professional physical education curriculum. Probably no one would dispute this principle. Considerable controversy, however, centers around the question of how much of each of these elements should be included. The answer to this question is largely

dependent upon which vocational level is under consideration. What are these vocational levels that need to be given consideration in our professional education curriculum, and what causes their existence?

Generally, when discussions of vocational levels arise, the steps of these levels are stated as being, beginning from the bottom of the ladder and going upward, either teachers, supervisors, researchers, and administrators, or elementary school, junior high school, senior high school, college, and university teachers or administrators. These ladders are illustrated in Figures 1 and 2 below. The basis for the belief in the existence

LADDERS OF FALSE VOCATIONAL LEVELS

Fig. 1

Administrators
Researchers
Supervisors
Teachers

Fig. 2

University teachers	University Admin.
College teachers	College Administr.
Sr. H. S. teachers	Sr. H. S. Admin.
Jr. H. S. teachers	Jr. H. S. Admin.
Elem, school teachers	Elem. School Admin.

of such levels is the fact that the individuals belonging to the groups in the higher rungs on the ladder do actually, on the average, receive higher salaries and are given greater prestige within the profession and in society.

We have already seen that the offices of administrator, supervisor, teacher and researcher perform different functions. They are, then, not different degrees of one thing, but different things, each of which may have within it grades or levels based on the individual's capacity to perform the function of that office. In like manner, it could be shown that in the fields of elementary, secondary and higher education different functions rather than different degrees of one and the same function denote their essential differences. Accepting this and accepting the fact that we cannot rank into higher and lower totally different entities or functions, just as we cannot assign ranks to five different kinds of dental instruments each of which is meant to perform a different function, we must come to the conclusion that vocational levels are not created by the nature of their office or function as such. We must accept, then, that the commonly accepted rankings do not constitute the proper vocational levels.

The genuine vocational levels are due to the differences in the intellectual abilities of individuals, where the "intellectual ability" is defined as the ability of the individual to understand and make effective use of fundamental principles and universals. The reason for the confusion regarding the matter of the vocational levels is that, in the past, no adequate distinction has been made between the job or function of an office and the individual who holds the job and who is delegated to perform the function. Thus, because instructors in the universities possessed, on the average, a greater amount of intelligence, as here defined, than the elementary school

teacher, thus receiving a higher salary and greater recognition, this higher level was associated with the office held rather than with the intelligence of the individual, where it properly belongs.

Once the proper distinction is made between the office and the individual holding that office, our principle is seen quite clearly, namely, that differences in function, if sufficiently great, call for a different *kind* of curriculum content, while differences in intellectual abilities must be met by different distributions of the amount of emphasis that is to be placed on the three curriculum content elements and on the amount of time spent on concretes and on universals. But this emphasis on the varying kinds of "bits of knowledges" is a matter of *method,* for it deals with how the curriculum content is to be handled.

The professional education must take into consideration both the learner and that which is to be learned. The lower the intelligence of the learner, and consequently the lower his probable vocational level, the more stress needs to be given to minute directions, to specific tasks, to elementary techniques and to the repetition of correct practice. The higher the intelligence, the less time needs to be devoted to technical training, and the greater can be the scope for self-reliance and self-direction. The difference in the treatment of the vocational levels is just this matter of emphasis. How much technical skill is needed for each vocational level is still an unsolved problem. It will remain unsolved until we know more of the functional ability of the people in the different levels. This much, however, can be said, that unless a professional school attains some measure of success in bringing its students up to the standard where they can arrive at sound judgments, where they can decide whether a thing is good or bad by reference to universals, and where they are able to analyze a situation and propose a plan for its modification, it is little better than a trade school.

Just as the range of intelligence of the students must condition the method of instruction, so also must the method be conditioned by the initial learning of the incoming students. It is to be remembered that the professional education neither begins nor ends with the professional school. The formal education that the professional school offers is but one part of the road which the novice must traverse before attaining mastery in his profession. An entrance examination and the study of the incoming student's past history can give us a sufficient amount of information regarding that student's present professional status and his intellectual ability to warrant their use. Though the notion that the personal qualification of a student must be taken into consideration in our professional education may seem a commonplace one to us as thinking individuals, it certainly is a rarity with us as practicing individuals. Yet any professional course of study that fails to take into consideration both the student's intellectual ability and his initial knowledge must be adjudged guilty of malpractice, however high its ideals may be.

We are now ready to give consideration to the general method of ap-

proach which a professional education must have if it is to give maximal returns for the time and energy expended. Let us first review the methods commonly employed in our professional schools. They may be grouped into three classes.

The first method is the one wherein the students are given the so-called basic courses, general knowledge courses that are developed in a logical way. This method calls for an absolute memorization of the subject matter contained in the subjects. The relationships of the "bits of knowledges" within a subject, if any relationships are shown at all, are by way of developing and expanding that subject. It is the method of liberal education carried over, *in toto,* into professional education by academicians who fail to appreciate the existence of a real difference between liberal and professional education. Such people believe in the efficacy of subject matter, leaving the application of it to the professional needs to each individual student. It is indefensible for use in professional education. The education received thereby is liberal or cultural education, and even that of a poor sort, for, like the politician on the fence, it is neither one nor the other by trying to be both.

The second method is the one wherein such basic, logically expanded courses as are described under the first method, are first given and are then supplemented, at some later time, with courses that deal with some specific phase of some basic subject. If the basic course were "statistics," the specialized course would be, perhaps, educational or sociological or actuarial statistics. If the basic subject were "physiology," the supplementary one might be physiology of exercise or physiology of nutrition. Being almost always taught in the same developmental manner as the basic subjects, these so-called professional courses become mere expansions of some "subject." They usually do have in them some application to the professional needs, but it is of a meagre kind, for they tend to give background rather than to solve the specific problems that confront the practitioner.

The third method again teaches the basic subjects as described under the first method, but with this difference, that throughout the course concrete instances from the field of practice are interjected in way of illustrating fundamentals. It is the systematic approach copiously illustrated by concrete cases. Subjects taught in this way are often called "applied" courses, such as applied anatomy, applied physiology, etc. Courses of this nature are on the increase, and that is a healthy sign, but even they do not adequately meet the needs of professional education. "Subjects" are still in the limelight, and the study of separated and disjointed "subjects" cannot give the student an adequate understanding of the concrete situations in their totality which the practitioner must meet and for the meeting of which he must be prepared.

A new way of handling the "subjects" has received birth in recent years. The new elements in this method are, first, that the various subjects,

or those parts of the subjects adjudged pertinent to our professional education, need not be introduced only at the beginning of a term or semester, but can be begun at whatever time is deemed ripe for their study; and second, that the length of these "subjects" or "blocks" can vary according to the length of time that is wished to be given to them or the length of time needed for their full understanding, which can be either one week, two weeks, seven weeks or twenty-four weeks. The introduction of this manner of handling the "subjects" is an improvement over the strict adherence to the semester or term subject matter time limit in that it possesses potentialities that have not as yet been explored.

The professional method of approach must be the method of the concrete to the abstract. It calls for the presentation to the students of concrete instances, or "cases" or "projects." It calls for a search for all the "bits of knowledges" that explain each instance, that is, that explain its causes, its nature and its consequences. If the instance is an illustration of a fundamental or of a law or of a universal, the method calls for bringing to light the nature of the relationship between this instance and the fundamental. As already said, fundamentals must be our guides if we are to be a profession.

Choosing "high jumping" as our concrete instance, it would need to be shown what "bits of knowledges," drawn from anatomy, psychology, physiology, physics, mechanics, sociology, history, etc., explain it under such varying conditions as age of the jumper, sex of the jumper, the environment at the time of the jumping, etc. It would need to be shown under what laws of the various sciences and arts the elements of "high jumping" are operative. It would also need to be shown what consequences such "high jumping" brings about.

Such an approach is the only one that merits use in our professional education. It is the only one that strikes directly at the heart of professional education, by focusing attention on the functional needs of the practitioner. It is the only one which is capable of fully obeying the laws of learning, which say in part, that we can get an understanding of a universal only by first getting a clear-cut impression of one, or of many—depending on one's intelligence—concrete instances that are typical of the same series of events and which embody this universal.

So far we have dealt only with the professional education as such. Let us now give consideration to the relationship that should exist between the professional and the liberal education in the formal education of our students. Having become fully aware of the differences in purpose, in content and in the method of instruction between a cultural and a vocational education, we are now in a position to state that *all* professional students of physical education should receive *both kinds* of education throughout the *entire* period of their formal education above that of the secondary school. This principle is commonly accepted in theory, but it is generally neglected in practice.

The neglect is of three kinds. In some instances no provision is made for liberal education even of the commonly accepted kind. This can still be seen in our Normal Schools, or the newly created Teachers Colleges, and in the private schools of physical education. In other instances the distinction between professional and liberal education is so vague and arbitrary, that one can hardly say which subjects are part of one and which part of the other kind of education. In the third instance, a division is made between professional and liberal education in which full time is devoted to one of these for one, two or three years, while the remaining years give full time to the other kind of education. This is based on the assumption that liberal education and professional education should each begin and end at a definite point in the path of a student's formal learning. The division between the two, however, is not one of mental maturation or the grade of schooling or of the subjects of instruction as is generally assumed. Professional as well as liberal education neither begins nor ends with the professional school. The individual, being a producer and a consumer at all times, must be given both kinds of education at the same time, and the difference between these two kinds of education must be a real and a significant one.

Another principle that follows closely is that the distribution of this liberal and of this professional education should be such as to give increasing emphasis, each year, to professional education, and decreasing emphasis on liberal education as the student's formal education progresses. The theory underlying this principle is, that in this way the student increasingly is made to shoulder the responsibilities of a producer, and the guidance and responsibility of his being a consumer, of living a rich and full life is also placed increasingly in his care. Thus provision is made for a transformation from the schooling days to the practicing days which should cause a minimum amount of maladjustment.

In conclusion it may be said, that a real need exists for clear thinking on this problem of the professional education of physical education teachers, and that much courageous action is still needed before our existing professional schools can be said to meet the full requirements of professional education as to its purpose, its curriculum content and its method of instruction.

A Comparison of the Effectiveness of Colored and Uncolored Anatomy Slides[1]

By W. P. MacLean

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THE problem was to determine objectively whether colored pictures were pedagogically superior to similar pictures uncolored, and if so, how much?, and why?

In the experiments, 152 boys of the various classes of the J. Sterling Morton High School were subjects. There were 76 in the experimental group and a like number in the control group. Pains were taken to adhere strictly to the law of the single variable, in the personnel, the procedure, and the materials of the experiment. E.g., two groups of 76 boys each were so organized as to be approximately equal in chronological age, intelligence quotient (Otis) and grade in school. These groups were then divided into seven pairs of classes with ten boys in each class, and one pair with six boys in each of the two similar classes.

Group I was superior to Group II in average school grade by .17 of a grade. Group II was superior to Group I in average I.Q. by one-half point, and superior in average chronological age by .04 years.

Materials.—The materials consisted of eleven anatomy slides in color, and eleven slides of the same subjects in black and white. The slides were numbered and titled as follows:[2]

Nos.

5—Superficial Muscles of the Body—Front View.[3]
59—Muscles of the Hand and Fingers (Three Subjects).[3]
27—The Brain.
23—Salivary Glands.[4]
8—The Teeth with Nerves and Blood Vessels Shown.[4]
63—Whole Digestive Tract.[5]
11—Stomach and Duodenum with Glands.[5]
16—General View of Heart and Larger Blood Vessels.[6]
17—General View of the Interior of the Heart—Ventral Dissection.[6]
14—General View of the Heart and Chief Blood Vessels.[7]
9—Comparative Anatomy of Digestive Systems of a Chicken and Man.

[1] Excerpts from a dissertation submitted to the graduate faculty of the Department of Education, the University of Chicago, in candidacy for the degree of master of arts; prepared under the direction of Doctor Frank Nugent Freeman.

[2] Keystone View Company, Meadville, Pennsylvania.

[3] Hereinafter treated as one slide.

[4] Hereinafter treated as one slide.

[5] Hereinafter treated as one slide.

[6] Hereinafter treated as one slide.

[7] Those statements in the reports of this pair that refer to heart and blood-vessels are grouped with pairs 16 and 17; those that refer to kidneys and bladder are grouped with pairs 63 and 11.

PROCEDURE

In this experiment, Group II saw and reported on all the colored slides and Group I saw and reported on all the uncolored slides.

Titled and numbered cards were not used in this experiment, but each pupil observed the eleven slides of his set and then wrote as many statements as he could on what he had observed, with no time limits. Each slide was shown for thirty seconds and ample time remained in the period for each pupil to write what he was able.

No instruction was given except to call attention to the names printed on the slides, to make clear to what parts of the picture the names refer, and to give simpler words for some of the more difficult printed terms; e.g., brain stem for medulla oblongata; gullet, or food pipe, for esophagus, etc.

Pupils were cautioned that, in this lesson, no credit would be given for merely listing items, but that they must say something about the part mentioned, e. g., describe it, locate it, or compare it to something else.

Physiology and anatomy are not required subjects at Morton High School,[8] and a check-up showed that but seven pupils in Group I and five in Group II had had the course. Most of the boys had had some lessons in the subject during their grade school courses, but since it was taken for granted that this experience would be about equally divided between the two groups, no account was taken of it in arranging the paired similar classes. There were thirty-five cases in which, to have similar I.Q.'s and chronological ages in the pairs to be compared, one of the pair was of a slightly advanced grade in the high school. Of these thirty-five cases, the lower classmen of the compared pair won in eighteen cases, the upper classmen in sixteen cases; in the remaining case their scores were even.

SCORING

In scoring, the individual papers were first gone over and one point was given for each acceptable true statement. No credit was given for statements that could not have resulted from a careful observation of the slides shown.

The papers were then gone over a second time in which each different correct statement was listed under its appropriate heading and a check placed after it for each appearance. An individual score sheet was kept on which the pupil was credited with his correct statements. This presented two bases for comparison and re-check in case of error, since the two individual scores and the two totals for each picture must, in accurate scoring, agree.

[8] Physiology is now a required subject for freshman boys.

A COMPARISON OF SCORES

Total Correct Statements for each Anatomy Slide—Table I and Figure 1 show that, in one case of the six, the results were practically even, the uncolored slides achieved superior results in four, and the colored in but one case.

The total superiority for the uncolored slides is 264 statements, an average of 3.47 statements per pupil in favor of the uncolored slides on the lesson.

DIFFERENT CORRECT STATEMENTS

Table II presents the data in regard to different correct statements on anatomy slides. The uncolored slides win in four cases, one favors the colored, and one is tied.

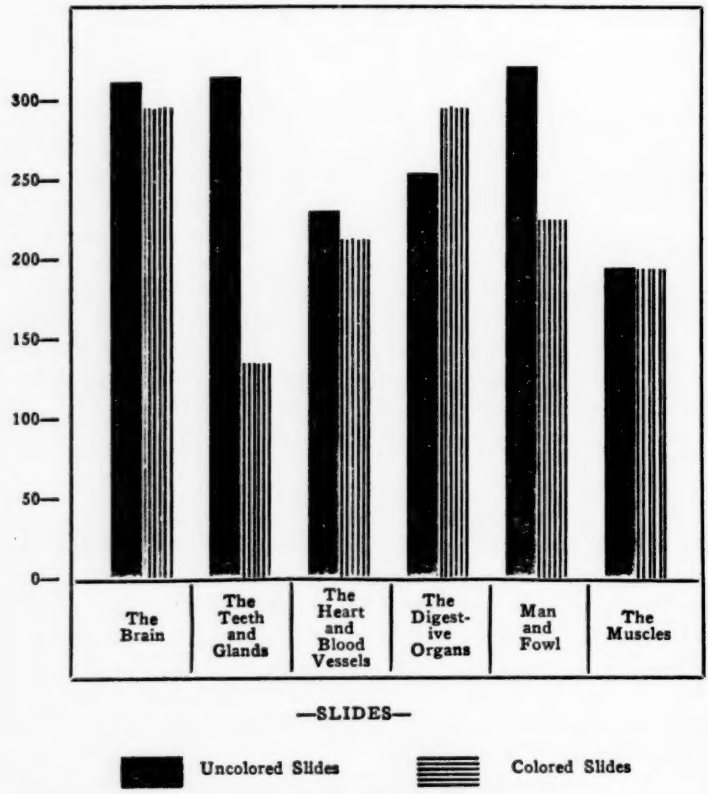

Fig. 1.—The number of correct statements for each anatomy slide.

TABLE I

Total Correct Statements for Each Anatomy Slide

Titles	Group I—Uncolored Statements	Group II—Colored Statements
The Brain	310	288
The Teeth and Salivary Glands	311	140
The Heart and Chief Blood Vessels	227	207
The Alimentary System	252	295
Comparison of Digestive Organs of man and domestic fowl	316	223
The Muscles of the Human Body	195	194
Totals	1611	1347

Average superiority per pupil for uncolored slides, 3.47

TABLE II

Different Correct Statements for Anatomy Slides*

Title of Slide	Uncolored Number of Different Correct Statements	Colored Number of Different Correct Statements
The Brain	37	34
Teeth and Salivary Glands	37	37
Heart and Chief Blood Vessels	46	44
Comparison of Digestive Organs, Man and		
The Alimentary System	71	79
Domestic Fowl	43	42
The Muscles of the Human Body	67	61

* By different Correct Statements is meant the sum total of correct statements from all the reports that are distinctly different; repetition is disregarded.

AN ANALYSIS OF THE RESULTS

An examination of the superiorities of the pair of slides entitled "The Brain," Table III, reveals the fact that the two slides are about equal in producing superiorities. In the uncolored column, we find that every item save the second one, "There is an area to control hearing," refers to the brain stem.

An examination of the two slides shows that the colored one presents the medulla oblongata in orange and black which offers a less striking contrast than the black and white of the uncolored picture and is doubtless no more true to nature.

The only apparent explanation for the +5 superiority of "There is an area to control hearing" is that the print may stand out better in the black and white than in the black and yellow of the colored slide.

If the last explanation is true, then it is rather difficult to explain the superiorities. "There is an area to control speech." "There is a motor area," i.e., arm, leg, head, face, and "That part of the motor area which controls the leg is at the top," in the column of colored superiorities. All of these facts depend simply upon ability to read and remember the printed matter which is certainly as legible in the black and white.

"The surface of the brain is full of creases" appears, without any very obvious reason, 11 more times for the colored slide. Color, well shaded, does aid in the perception of depth.

"The brain stem is below the brain and leads to it" is the only colored superiority that gets below the cerebrum, and it is half directed toward the cerebrum.

TABLE III
Superiorities of Colored and Uncolored Anatomy Slides

Uncolored The Brain	No. Times Appeared	Colored The Brain	No. Times Appeared
One part of the brain is brain stem..	+ 9[1]	There is an area to control speech....	+ 8
There is an area to control hearing...	+ 5[1]	There is a motor area.....	+ 6
The brain has three main parts.....	+ 6	The brain stem is below the brain and leads to it	+ 6
Medulla looks like bundle of strands..	+ 6	The surface of the brain is full of creases	+11
All nerves go through brain stem.....	+ 7	That part of the motor area which controls leg is at top	+ 5
Brain stem joins brain and spinal cord	+ 8		
Nerves come to form brain stem look like large cable	+ 7		
The Muscles		**The Muscles**	
The muscles in the fingers start up in the fore-arm	+13	Each muscle does a separate job.....	+ 9
		Some muscles in fore-arm end at the wrist	+ 5
Muscles are inserted at places they move, by means of cord.....	— 8[2]	About 10 or 13 muscles control the fingers	— 7
The Heart		**The Heart**	
Many tubes lead to the heart.....	+17	The heart has four chambers	+11
Many tubes lead from the heart away to other places	+17	The main blood vessels run up in back of the stomach	+ 5
There are small veins spread over outside surface of the heart	+15		
The upper chambers are intake	+ 5		
The heart moves from the left in toward the center of body and back again	— 6		

For some inexplicable reason the attention was directed to the medulla in the uncolored and to the cerebrum in the colored picture. Perhaps this may be because the cerebrum is more colored in the colored picture while the medulla has the sharply contrasted thin, parallel strips of black and white, in the uncolored slide.

A study of the two pairs of slides entitled, "The Muscles," is convincing that color adds nothing to studies of this nature. The contrast between muscle and tendon is as great in one as in the other. There are 21 points of superiority in each column, but the superiorities of the uncolored column are more specific and more valuable.

For "The Heart," had the subjects had sufficient instruction to know that veins are generally pictured as blue and bring blood to the heart while red arteries take it away, the colored picture may have proved of greater value. However, to most of the 152 observers, arteries, veins, nerves, and ducts were indiscriminately "tubes," and so they were termed in the reports. It follows that, if one does not know what he is supposed to see, color will not help much. It may even prove puzzling.

[1] + Signifies that the statement indicated appears the designated number of times over and above the number of times it appeared in the opposite slide report.
[2] — Signifies that the statement did not appear at all in the report of the opposite slide of the pair.
[3] All results were tested by the Holzinger formula for the P. E. of an observed frequency. See Karl J. Holzinger, "Statistical Methods for Students in Education," page 243. An observed frequency of less than 5 is insignificant for 76 cases.

The coronary system was reported more often from the uncolored slide because of greater contrast between the vessels and the heart's surface. In the colored picture, too much attention and too little understanding were claimed by the brilliant blues and reds. For the colored 11, the clever shading from the deep red of the deeper chambers to the light yellow of the partitions *does* add the illusion of depth and makes more apparent the fact of the four chambers.

TABLE III

Superiorities of Colored and Uncolored Anatomy Slides (Continued)

Uncolored Slides The Teeth, and Mouth Glands		Colored Slides The Teeth, and Mouth Glands	
There are three pairs of Saliva Glands	+15	The second largest salivary gland is back in the throat	+ 5
One is above tongue near nose	+27		
One is under tongue	+21		
One is well back by ear	+23		
The glands look like sponges	+ 9		
Each tooth has its own separate nerve	+18		
Each tooth has its own blood vessels	+17		
Each tooth has its own nerve, artery, and vein	+11		
The tooth is not solid bone	— 6		
The salivary glands vary in size	— 7		
There is one large artery above and one below, and smaller ones branch off to each tooth	7		
The Alimentary System		**The Alimentary System**	
There is a large and small intestine	+ 5	Many ducts lead to the small intestine.	+ 5
The bile duct enters the duodenum	+ 6	The appendix hangs on a fold of large intestine	+ 5
The liver is on the right side	+ 8	The intestines wind around	+11
The large intestine curves around the small intestine	+10	The stomach empties into the small intestine	+ 8
The liver is large compared to the other organs	— 6	The small intestine has many winds and folds	+ 9
		The small intestine is just below the stomach	+ 5
Man and Domestic Fowl		**Man and Domestic Fowl**	
Man has no crop; fowl has	+20	Man and fowl have many of the same organs, but different shape and proportion	+ 5
Man has no gizzard; fowl has	+17	The fowl's liver is comparatively larger	+13
Man has spleen; fowl has not	+13	Man's apparatus is more compact	+ 5
Man has stomach; fowl has not	+11		
Fowl's intestines are different	+ 9		
Man's intestines are larger and thicker, comparatively	+ 9		

The brilliantly contrasted blue and crimson "tubes" that follow the spine in the colored number 14, account for the fact that five more reported the main blood vessels from the colored slide.

The bright colors noted in the above paragraph probably also account for the fact that the attention of the observer was drawn away from the two hearts, and six observers of the uncolored picture only, reported, "The heart moves from the left in toward the center of the body and back again."

In the pair of slides numbered 23, "Salivary Glands," color overreaches itself. Color has little to contribute to the main features of these slides, viz., the ducts and glands. Therefore brilliant color attracts undue attention to the lips, to the bisected muscles, to the esophagus and to the veins, while the observer of the uncolored slide sees what he is expected to see and concentrates upon it.

The same might be said of number 8, "The teeth with nerves and blood-vessels shown." The printing shows that there is a nerve, an artery and a vein. The color adds nothing for those who do not know what it means.

In slides 63, "Whole Digestive Tract," we have the only case of this lesson in anatomy wherein the colored slide has proven superior. The picture is compact. We see nothing that we are not intended to see. The colored picture employs reds, yellows, blues, and whites to furnish advantageous contrasts.

Two of the uncolored superiorities refer to the liver. The liver, being black, furnishes the only striking contrast in the uncolored picture and thus calls attention to itself.

"The bile duct enters the duodenum," comes from the pair numbered 11, "Stomach and Duodenum with Glands," to which color adds nothing.

The pair numbered 9, "Comparative Anatomy of Digestive Systems of a Chicken and Man," is the last pair of slides to be considered in Table III. Here again, too much attention is attracted to the colorful maroon livers. These are the only organs helped by color in these small pictures. The print is the chief aid in distinguishing the organs, and color adds little except in the case of the liver.

TABLE IV

Relative Scores of Group I and Group II on Colored and Uncolored Pictures in the Other Experiments of This Study

	Group I Scores Preference			Group II Scores Preference		
Style	Uncol.	Tie	Color	Uncol.	Color	Tie
Flat Pictures 17	8	51	33	36	7
Art and Biog. Slides 19	4	53	49	23	4
Geography Slides 32	5	33	21	48	1
Stereographs 2	0	59	54	3	4
Totals 70	17	196	157	110	16

It may be seen in the above Table IV that Group I has in six other similar experiments for other school subjects shown a marked preference for the colored pictures while here it has viewed and reported on the uncolored anatomy slides and shown them to be superior.

The success of Group I with all uncolored anatomy slides is more impressive when it is remembered that in six other experiments Group I did better with its colored pictures.

SUMMARY OF FINDINGS

1. In anatomy slides, color aids in distinguishing the cells of the heart, and the various crowded organs of "The Whole Digestive Tract."

2. In picturing the brain stem, the salivary glands and ducts, the structure of the teeth and the comparative anatomy of Digestive systems of a chicken and man, color may be a distinct disadvantage. N.B. With more detailed explanations on the part of the teacher, the results may be different.

3. Color is of value in aiding the illusion of depth as is evidenced by the superiority of the colored slides in presenting the heart cells and the uneven surface of the cerebrum.

4. In parts in which the perception of depth is not important, and which really do not have much natural color, as the medulla, or which all have the same color as the muscles, color adds nothing to the presentation.

5. Color is of advantage in showing the liver or other organs which are naturally highly colored especially when a number of organs are shown crowded together, as in No. 63, "Whole Digestive Tract," where the contrast afforded by the colors aids the perceptions.

6. One highly colored organ among others in a slide that does not admit of color may attract undue attention to the organ presented in color to the neglect of other items that are as important to a complete perception of the slide, as is the case with No. 9, "Comparative anatomy of the digestive systems of a chicken and a man."

7. A study of the Common and Uncommon Statements in the Reports of the Colored and Uncolored Slides, seems to offer evidence that an impressive percentage of the observers of the colored slides did not see the same things as their fellow students perceived in the uncolored slides.

CONCLUSIONS

1. Indiscriminately adding so-called natural color to anatomy and physiology slides does not increase their lesson value in proportion to the increased cost. An anatomy slide is not necessarily better because it is colored.

2. Some anatomy views better stimulate the arousal of meaning without detracting from attention and interest when they are presented without color.

3. To logically determine what anatomy slides should be colored requires a careful study of the total sensory situation.

The Goals of Health Education[1]

By Stuart A. Courtis, Ph. D.

Professor of Education, University of Michigan

WHEN a group of specialists invites an outsider to discuss with them a subject strictly within their own field, it is a safe inference that they expect him to contribute something from his field to theirs. I don't know much about the goals in health education, but I am daily concerned with experimentation in education. What I am really going to talk about, therefore, is "The Scientific Determination of Goals in Health Education."

The American public has been completely "sold" on the desirability of health and knows pretty clearly what it wants in the way of health. Turn the advertising pages of any standard magazine. From underwear to travel, the lure that is used is health. A current ad pictures a young woman, with her attendant young man, riding the surf boards in a distant clime. The caption reads, "sun-tanned, their bodies lithely bend in balance as the waves rush by." Promises of youth, beauty, vigor, daring, control, pleasure, are the bait that captures dollars these days. Our "physical culture" magazines entice many Americans to part from their shekles by a pictured display on every newsstand of big-muscled Hercules and graceful Amazons. Our movie stars give wonderful exhibitions *on the screen* of what it means to excel in bodily vigor and control. On every hand we are assailed with the objective representations of the goals of health education which make the most appeal to the buying public.

Generalizing from such data, it is relatively easy to set up a series of goals. In a general way, they are evidently of three main types; namely, the attainment of:

1. Perfection of Structure
2. Perfection of Functioning
3. Perfection in Maintenance

For instance, every intelligent human being desires a full complement of organs, both for himself and for his children. Mr. Average Citizen looks to the school to take whatever steps are necessary to insure in his children not only normal and adequate development of each and every organ, but that balance and harmony of development which result in both beauty and efficiency. For after all, there is no value in having a body if it doesn't function well.

The first element in perfect functioning is pleasure, joy. There

[1] An address delivered before the Physical Education Section of the School Masters Club, Ann Arbor, April 25, 1930.

is not a person who at some stage in his career has not felt the sheer joy of living; who has not experienced the ecstasy caused by vital energy flowing smoothly through nerve and muscle under perfect responsiveness to his desire and will. Once experienced, the joy of perfect functioning remains forever in memory as an essential ingredient of perfect happiness. As the years go by and we bemoan "our loss of youth," we really mean that our reserves of energy grow less, our skills diminish, our power of efficient achievement wanes. Perfection of functioning implies not only structural perfection in the body, but that energy, skill, and power in operation which spells joy and satisfaction.

However, the human body is so constituted that it functions only at the expense of its perfection. All action breaks down tissue somewhere. For health, there must be adequate elimination of waste, and adequate restoration of the physical machine to perfect condition. Re-creation is well named, although our pronunciation of the word matches our frequent use of the activity "wreck-reation." Then, too, the human mechanism is subject to injury and dangers from external causes. For health there must be freedom from disease, freedom from decay, yes, and in the end, freedom from the worst danger of all, death. The desire for immortality, for endless life and vigor, is an age-old desire. If there are ways of maintenance that will put off old age and delay the inevitable catastrophe, Mr. Average Citizen expects us to teach them to his children.

The way to health has seemed to many to be found in activity, exercise, development, but as an experimentalist, I must point out that another alternative exists. Even our ad writers recognize that muscular development is being used less and less in this machine age. "Her longest walk from curb to car" stares at us from many a magazine. Certainly each one of us spends many hours, and will increasingly be forced to spend still more hours, in small-muscle activities in spaces shut away from light and air. Should the goal of health education be the development of the minimum structure that will function perfectly with the *minimum* of exercise and repair? Is the ideal of the future to be the small-boned, small-muscled, light-weight, steel-nerved individual who makes adjustments at lightning speed with minimum expenditure of energy, and with great powers of endurance? Our physical Hercules do not seem to be long-lived these days. Is athletic activity negatively correlated with length of life? Of course, Mother Nature will in the end settle the question by the age-long process of survival, but might we not help her out a bit? Is it not time for intelligent research and experimentation along such lines? To an outsider our present programs of college athletics and much of the so-called health education activities in the grades seem totally out of date. In many schools, health education aims and meth-

ods would have been appropriate for the days when Pontiac and his Indian braves rode and fought over the spot where you are now sitting, but times have changed. What program of development is best suited to the worker in the modern factory or office building, the dweller in a modern flat or family hotel? I don't know. My mind is assailed by many doubts and questions. I'm glad the responsibility for deciding such a momentous question does not rest upon my shoulders.

At any rate, our advertising specialists exploit the present situation to their benefit. For instance, under the two words, "Nature Knows," printed in display type, I found the following statement: "Civilization exacts its penalties—hair that lacks luster, teeth that decay, organs that fail, complexions that must fly to the beauty box.

"A dietary too nice in its refinements withholds essential mineral salts from famished cells."

How true these statements are with respect to teeth the recent survey by the American Child Health Association proves.[3] The survey reports the number of ten, eleven, and twelve year old children in grades five and six who had each of their four first molars free from decay. (Children having unerupted or extracted teeth were excluded.) The facts are as follows:

TABLE I

PERFECTION OF STRUCTURE: TEETH

Age	Number Examined	Percentages of Boys and Girls Examined Who Had First Molars Free from Decay			
		UPPER		LOWER	
		Right	Left	Right	Left
12	1149	31	30	22	21
11	1636	34	34	25	24
10	1157	40	42	31	30

Even among the ten-year-olds, on the average, only one child in three has molars free from decay, while two years later, but one child in four has perfect molars. Do you see why ads of attractive young men and women, smilingly showing a gleaming set of perfect teeth have such pulling power?

Of course, the real question is "what can be done about it?" And each person has a different answer. Yet such a state of affairs spells just one thing, ignorance. We do not disagree about the multiplication tables, nor about the laws of electric currents. Neither would we disagree about the laws of health if they were known. Therefore, I contend my answer "ignorance" is the best explanation. What we need in health education is research, and still more research until ignorance has been replaced by knowledge.

"But," you will ask, "are there laws in biology as there are

[3] Public Health Aspects of Dental Decay in Children. School Health Research Monographs. No. III, page 26-27, 116-118.

in physics?" My answer is "yes," although these laws are a recent discovery and not yet generally accepted.

For instance, look at the curve for the cutting of the upper molars in boys.[3] (Figure 1.)

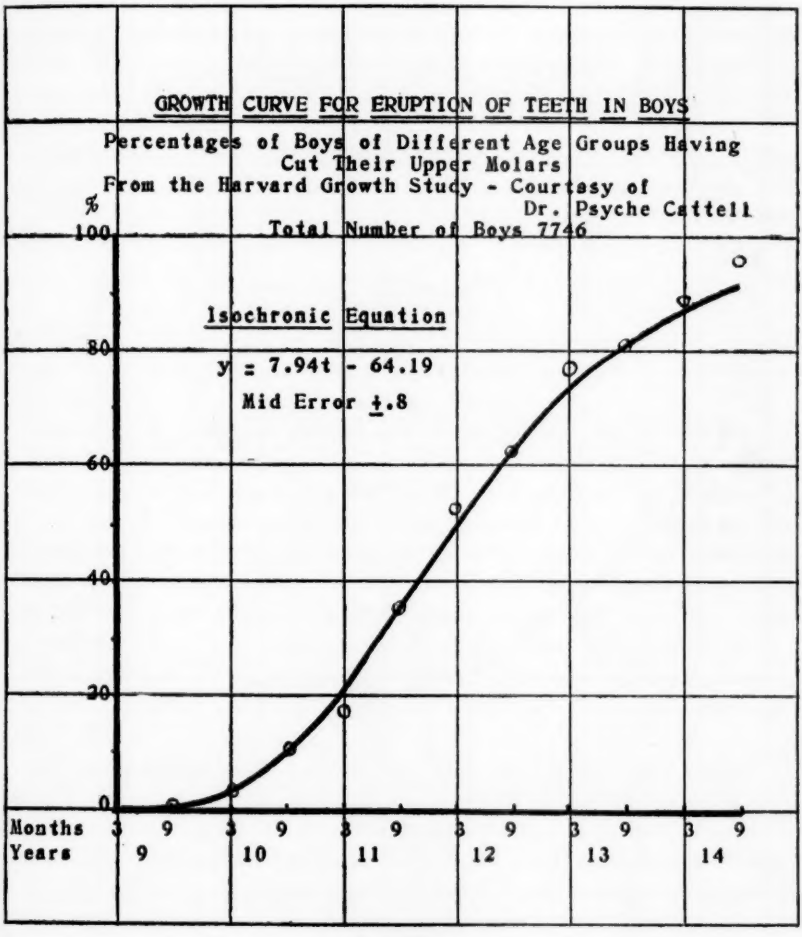
GROWTH CURVE FOR ERUPTION OF TEETH IN BOYS
Percentages of Boys of Different Age Groups Having Cut Their Upper Molars
From the Harvard Growth Study - Courtesy of Dr. Psyche Cattell
Total Number of Boys 7746
%
100
80
60
40
20
0
Isochronic Equation
y = 7.94t - 64.19
Mid Error ±.8
Months
Years
3 9 3 9 3 9 3 9 3 9 3 9
9 10 11 12 13 14

FIGURE 1

Can anyone doubt that such regularity of development is indicative of law? To be sure, one swallow does not make a summer, but the Harvard Growth Study now has data based on the observation of many children year after year, so that a total of 15,434 observations may be consolidated into a single figure. (Figure 2.)

There is some irregularity at the upper end of the curve, but it is

[3] From the Harvard Growth Study through the courtesy of Professor W. F. Dearbourne and Miss Psyche Cattell.

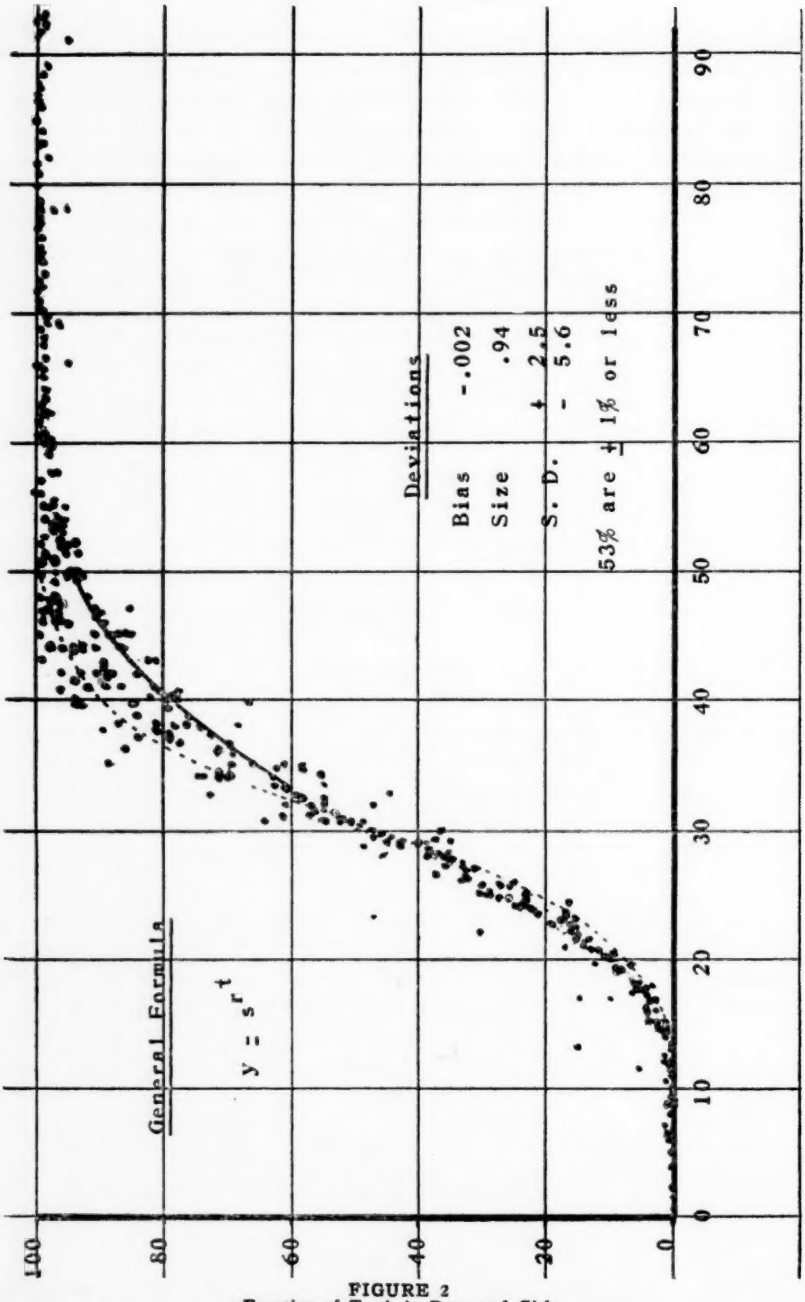

FIGURE 2
Eruption of Teeth in Boys and Girls

Twenty-eight curves superimposed. Data from Harvard Growth Study. Each dot represents the percentage of children of a given age group having a given tooth cut. Total number of children represented, 15,434. Total of dots, 369. Median deviation of dots from mathematically perfect curve, .94.

Vertical axis represents percentage; horizontal axis represents isochrons.

known that differences in environmental conditions increase with age. These and selection probably account for the discrepancies. Even with these data, imperfect because collected with no knowledge of the conditions which need to be controlled, the median deviation of the 369 points in the figure from the mathematically exact curve represented by the formula $y=sr^t$ in which "s" stands for the starting point, "r" for rate of development, and "t" the time, is only .94 of 1 per cent. Few *discoveries* of law in science have been based upon data equally precise.

Hereafter, I shall call the peculiar S-shaped curve evident in the figure "the simplex growth curve." It is produced whenever any living organism is acted upon under stable conditions by constant forces which bring about progress towards the type of the final status we call maturity. In the past, many statisticians have supposed this curve to be an ogive from a normal distribution, but it is not. For instance, in Figure 2, I have drawn with a light dotted line an ogive so placed that its one- and fifty-per cent points coincide with the growth curve. The difference between them is characteristic.

It may be hard for you to accept my generalization that all biologic growth under controlled conditions conforms to this curve because, in the past, all of us have seen more evidence of variability in growth situations than of uniformity. Nevertheless, the generalization is easily supported by evidence. For instance, if I superimpose fifteen growth curves, three from growth of plants, four from growth of animals, three from growth in scores in mental tests, two from growth in scores in educational achievement tests, and three from social phenomena, such as the attainment of the marriage state in men, or the elimination of students from college, they yield the same specific pattern. (Figure 3.)

These general results from data collected from many published sources have been confirmed by laboratory experimentation under rigidly controlled conditions. This means, therefore, that a new method of analytical attack is available for use in research in health education, a method involving only simple arithmetic, but making possible the measurement of the effect of any factor under the law of the single variable.

For instance, a great many years ago it was reported that well nourished children cut their teeth earlier than those not so well-nourished. (Figure 4.) The complete data for the curves for the two groups of children, if measured in isochrons as the new growth units are called, are expressible in the simple equations shown in the figure, and a comparison of the rates of growth shows that the well-nourished group cut their teeth on the average 1.44 times faster than the normal children. Unfortunately, this was a very crude collection of

data. The "well-nourished" group are merely children from homes of wealthy parents. However, it would be possible with animals in the laboratory, and in a less precise way with children under a variety

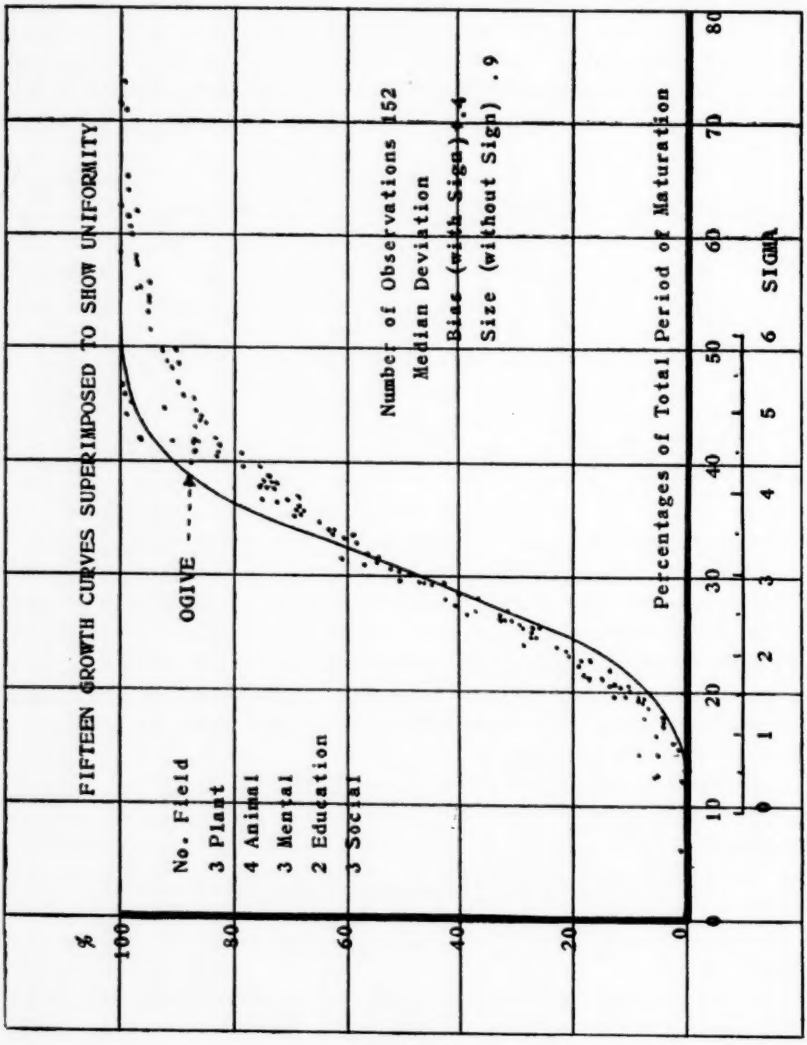

FIGURE 3

Three of the curves represent growth of plants, four, growth of animals, three, mental growth, two, educational growth, three social growth. The data have all been expressed as percentages of ultimate development. Each dot in the figure represents an observation of the percentage of maturity attained at a given time. The total number of observations is 152. The median deviation from a mathematically perfect growth curve is .9. The curve shown in the figure is an ogive from a normal distribution so drawn as to coincide with the growth curve at points 1% and 50%. The sigma scale for the ogive is shown below the isochron scale. The ogive is given to illustrate the point that the growth curve is not an ogive from a normal distribution, as has been frequently assumed.

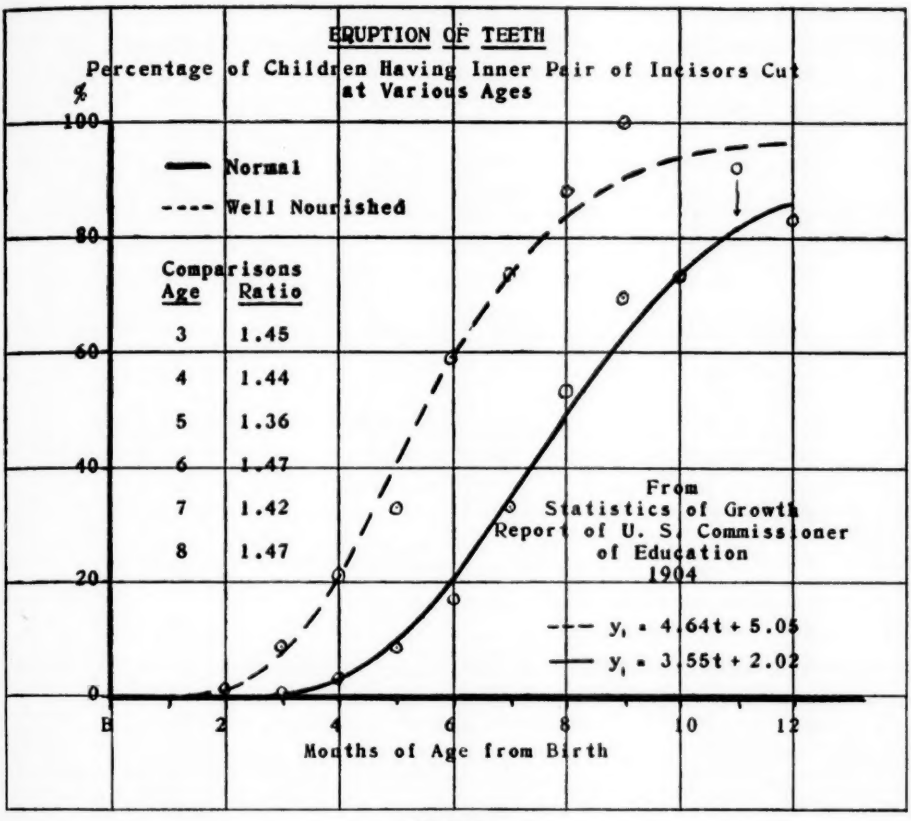

FIGURE 4

of social conditions, to determine the precise effect of any single item of diet or any combination of items. I have no health data to illustrate my point, but if you will let me use results from growth in spelling, I can illustrate the general method further.

In academic subjects, a basic problem is to measure the efficiency of teaching. In the past, our results have been most inconsistent, but thanks to our recent discoveries our problem is solved. For instance, compare the growth curves for the two words "sincerely" and "customary." The first is in the course of study, the other is not. (Figure 5.)

"Sincerely" is taught in the seventh grade, but some of the children, through incidental learning, are able to spell the word long before it is taught. The curves for the two words run along closely together. The rate of growth for "sincerely" is on the average 3.73 isochrons per year. But at the seventh grade, where "sincerely" is taught, the rate for "sincerely" jumps to 11.08 isochrons per year,

or 2.97 times as much as the previous rate. It is evident, therefore, that in this school system, teaching is about twice as effective as incidental learning, for of course the children would have made the usual incidental growth had no teaching taken place.

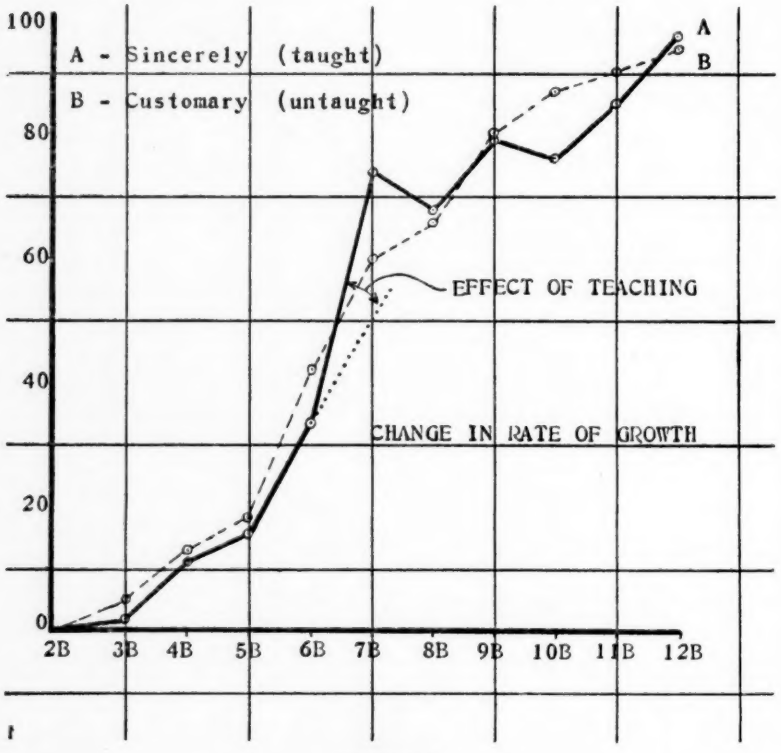

FIGURE 5

Measurement of the Effect of Teaching

The curves are based on the percentages of children in the various age-grade groups who spell the given words correctly.

The dotted line represents the growth curve for the word "customary," which is not in the course of study. The curve for the word "sincerely," up to the grade where teaching occurs, closely parallels the curve for the word "customary." The isochronic equations for the words are:

Customary ——y^1=3.81t—6.82 mid-deviation 2%
Sincerely— —y^1=3.73t—4.21 mid-deviation 3%

When teaching occurs, however, the rate for "sincerely" changes from 3.73 to 11.08; that is, the rate becomes 2.97 times as great. In other words, the effect of teaching is approximately twice as great as that of incidental learning.

In passing, it may not be out of place to call attention to the way the curve for "sincerely," as soon as the special emphasis of teaching is over, drops back to the value it would have had under incidental learning. In academic education, we are finding that the rate of evaporation of much knowledge and skill, taught *out of relation* to life and normal growth, is surprisingly high. Possibly the same state of affairs will be found in health education.

The new system of measurement is based upon a very simple change in method of attack. In the past, we have measured growth in units of magnitude expressing approach to maturity in size. (Figure 6.)

In the new system, growth is measured in units of time. Isochrons are defined as percentages of the total period of maturation. The word itself emphasizes the fact that in the new system "growths made in equal times *are considered* equal."

In other words, the change in method of measurement is merely a shift from measuring along the vertical axis to measuring along the horizontal axis. When we use the vertical axis, the relations between our factors is so complex that simple relationships are obscured and can be discovered only by the use of higher mathematics. When we use the horizontal axis, the relations between factors are all expressible in simple time ratios, and no mathematics more difficult than sixth grade arithmetic is required. For instance, to be concrete, the curve in the figure is represented by the exponential equation, $y=sr^t$ when we use the vertical axis and by $y=s+rt$ when we use isochrons. The advantages of the new system are manifold.

For instance, I suppose few of you are ready to believe that by turning the crank on a computing machine it is possible to determine the percentage of high school students of various ages able to clear four feet in the high jump, but such is the case if the computation is made in isochrons. For instance, recently, through the courtesy of V. S. Blanchard, Director of Health Education of the Detroit Public Schools, there came into my possession the excellent measurements made by the Health Education Department of Eastern High School. Part of the results for the high jump were as follows: (Table 2, Figure 7.)

TABLE II

PERFORMANCES OF STUDENTS OF VARIOUS AGES IN HIGH JUMP

Age	Number At Each Age	Percentage of Students of Each Age Group Able to Clear Four Feet: Per Cent	Computed Per Cent	Deviations
13.5	128	7.8	6.7	—1.1
14.5	397	16.9	16.9	0.0
15.5	664	33.1	31.0	—2.1
16.5	609	46.6	46.3	—0.3
17.5	322	60.2	60.2	0.0
18.5	103	68.9	71.6	—2.7

Equation: $y=(3.63t-30.38)$ mid-deviation 1.6 per cent

That is, the equation predicts the percentages of the different ages jumping four feet with a mid-deviation of about 1 per cent. The equation also predicts the percentage of pupils able to make a score of fourteen feet in the broad jump with a mid-deviation of 2.3 per

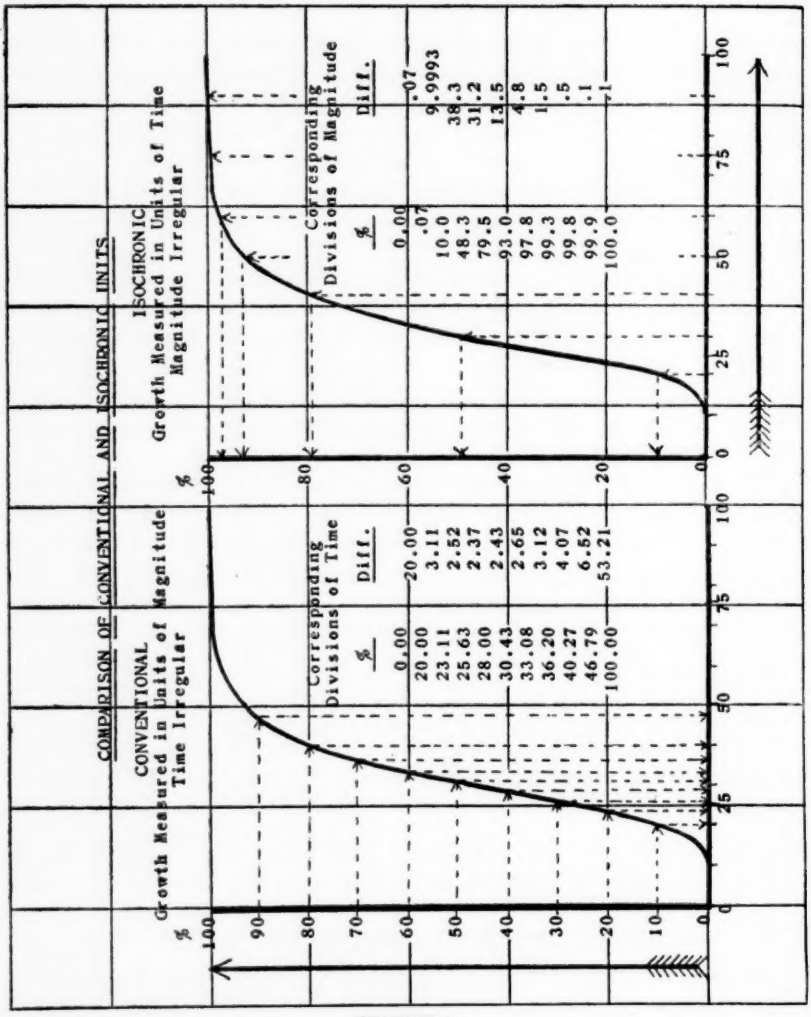

FIGURE 6

In the left hand figure, the **vertical axis** is divided into parts representing 10, 20, 30%, etc., which are equal in magnitude. Dotted lines are drawn from these points to the curve and projected on the time (horizontal) axis. Calling the whole axis 100%, the table labelled "corresponding divisions of time" is to be read, the curve changes from zero to 10% in 20% of the maturation period; it changes from 10% to 20% in 3.11% of the maturation period, etc. Note the irregularity in these changes in divisions of time. They are not expressible in any simple relationship.

In the figure at the right, **time axis** (total period of maturation) is divided into equal parts representing 10, 20, 30%, etc. which thus represent equal times. From these points, lines are projected upward to the curve and horizontally from the curve to the vertical axis representing magnitude of development. The table labelled "corresponding divisions of magnitude" is to be read, the curve changes from zero to 10% in time, the development changes from zero to .07% of maturity; as it changes from 10 to 20% in time, the development changes from .07% to 10%, etc. Note irregularity in changes in magnitude.

But it is easy to measure training in units of time, and the magnitudes corresponding to each division of time may be computed once for all. This has been done and the new system which makes use of these values has been called "isochrons." In isochrons, the rate of growth is always constant during any growth cycle and results are expressible in terms of simple laws.

In other words, the new system of measurement merely shifts the emphasis from the vertical axis representing magnitude to the horizontal axis representing time.

cent. The two growth curves are almost identical and the fact that the precision of measurement in the broad jump is less than in the high jump seems to account for the discrepancies. (Figure 7.)

Fourteen feet was chosen as the basis of comparison because it

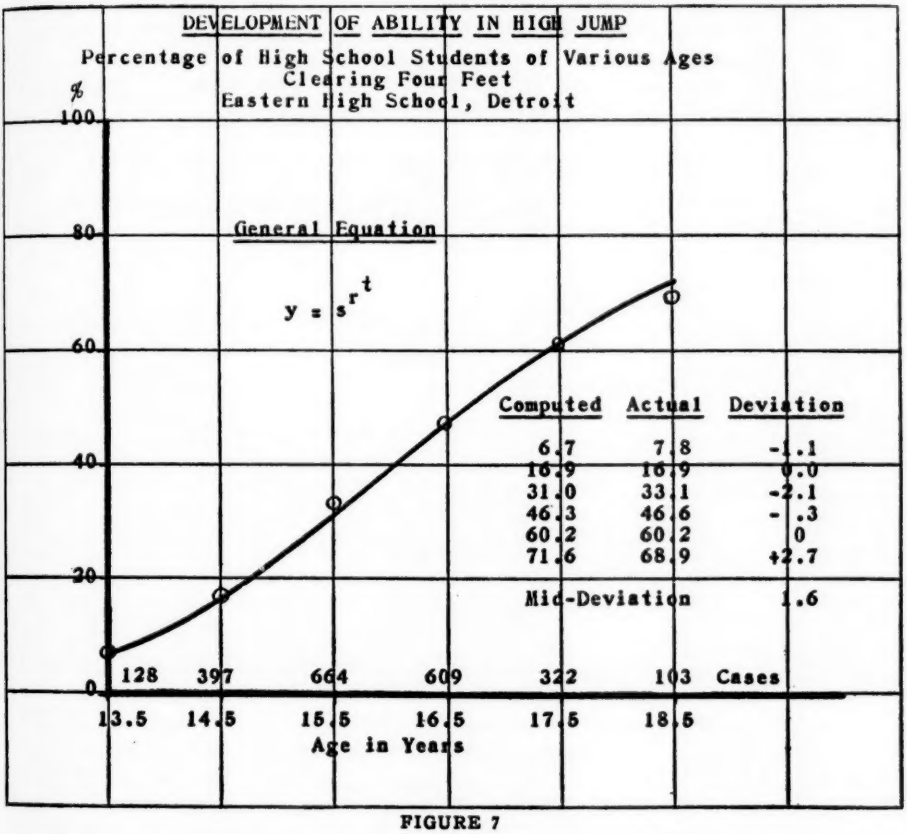

FIGURE 7

is the distance jumped by the same percentages (33.1) of fifteen-year-olds that cleared four feet in the high jump. It was also found that 33.1 per cent of the fifteen-year-olds could put the shot 23.5 feet, and dash 92.8 yards in twelve seconds. (Figure 8.) The equations for these events are:

Shot Put——y=5.38t—57.23 mid-deviation .9 per cent
Dash————y=4.89t—49.43 mid-deviation 3.6 per cent

In other words, all four events may be expressed in simple isochronic equations as accurately as the events themselves were measured.

You will appreciate right away that such equations throw much light on many aspects of the situation which otherwise could not be

determined. For instance, calling the intrinsic difficulty of the high jump 1.00, and basing comparisons on the relative rates of growth, the intrinsic difficulty of the broad jump is also 1.00, of the shot put .67, and of the dash .74. These figures have value as a means of equating the allowance for different events. From such studies it would be possible to make scales of *equivalent achievement* in the different events.

But I will not weary you further. I have said enough, I think,

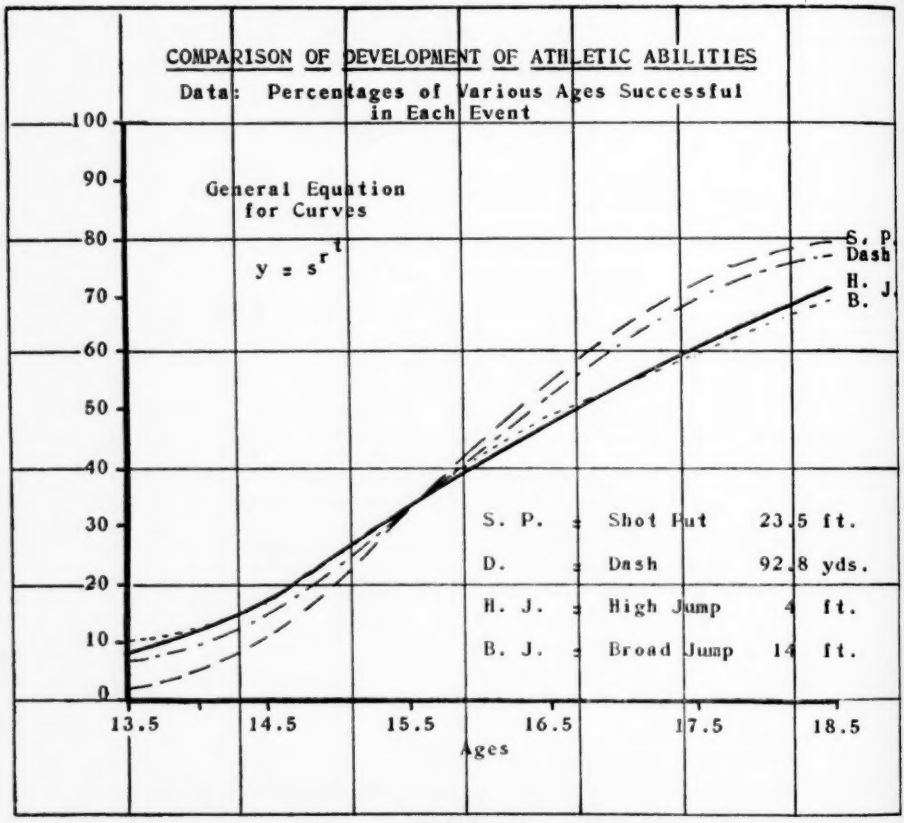

FIGURE 8

The curves represent the percentages of the various age groups who could put the shot 23.5 feet or more, run 92.8 yards or more in 12 seconds, clear 4 feet or more in the high jump, and clear 14 feet or more in the broad jump. These standards were chosen because they are the performances equalled or exceeded by 33.1% of the fifteen-year-old group. (Note that all the curves pass through a common point at fifteen years.) All four curves may be precisely represented by equations of the general formula, $y=sr^t$

to prove my points; namely (1) there are many research problems that must be solved before any valid statements of goals in health education can be made, and (2) the new technique based on the laws of growth offers a new and very promising method of attack on the problems which have baffled us all for so long. All that is lacking is

a devoted group, scientifically-minded workers, to give the many hours of experimental and statistical analysis necessary to solve the problems.

Let me leave you then, with the suggestion that there are two sets of goals for health education; one set for the pupils, and one for the teacher. (Table 3.)

TABLE III

GOALS OF HEALTH EDUCATION

What Health Means for the Pupil	Teacher Development Necessary Before the Pupil Goals Can Be Objectively and Precisely Determined
1. Perfection of Structure	1. Awakening of faith in the possibilities and value of research
2. Perfection of Function	2. Recognition of basic problems
3. Perfection of Maintenance	3. Experimental determination of solutions in terms of laws of growth
4. Use of the three above for worthy life purposes	4. Cooperative pooling of the results of research

Is it necessary for me to remind you that the American public believes in Health Education and has invested heartily in it? They have provided playgrounds, equipment, teachers, and have sat back expectantly to await the desired results. These results have been slow in appearing, and, as you know, the public is getting a bit restless. Are they beginning to lose faith? Must it be necessary for outsiders to survey conditions in Health Education, formulate its problems, and devise its methods of solution? I believe not. I believe that in your own ranks interest in research studies directed toward the experimental determination of both goals and methods is already beginning to displace dogma and speculative theory. I desire in this paper, not to criticize but rather to appeal for your assistance. Many academic teachers are beginning to realize that the solutions of all of their problems have "health" as one important factor. We cannot do *our* work successfully unless *your* work is equally successful. It is useless for us to attempt to carry on a research program very far in advance of yours. The truth is that education is *one* thing, not many separate activities, and "cooperation" is the masterword that opens the door to success. The need for research is evident to all, the growth technique offers new potentialities of attack. My appeal is for men and women, scientifically minded and trained in research methods, to join with like-minded teachers from other departments of the service in a cooperative effort to determine on a more objective basis the aims towards which all of us should move.

Papers from the Society of Directors of Physical Education for Women in Colleges and Universities

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The Place of Posture in the College Program of Physical Education

RUTH H. ATWELL
George Washington University

IN analyzing the place of posture in the college program of physical education we must first outline the general divisions of activities in the program as a whole. There is the division of health, which underlies and is woven into all the activities. Secondly, there is the motor training division, which includes the broad field of sport-skills, both individual and team types; the training in rhythm through the varieties of dancing available; and the body control and posture education that is possible in the field of gymnastics, both group and individual. The third division might be called the recreative one. This includes the sheer joy of physical activity experienced in play of all kinds and the training for leisure-time activities during and particularly *after* college.

What place has posture in this program? There are many opposing views in answer to this question and interesting possibilities for further research as to whether posture training can be accomplished through sports, how posture affects motor skill in sports, to what extent good posture is essential to health and so on. Out of all this confusion of ideas I feel that the most expressive term to describe its place is as a "contributing factor." At present it is a "contributing factor" in the two large divisions "health" and "motor training."

Because of posture's important place in these two broad fields the college department assumes the responsibility of giving every student the knowledge of "how" to assume the best carriage of her body, possible to her as an individual, and the knowledge of "why" this carriage of her body is of value to her. The department does its share when the student knows how to assume good posture. Whether or not she practices it is up to the girl. She is more apt to practice it if an educational approach has been made by teaching her why it is important from the standpoint of anatomy and physiology, and for the sake of grace and poise of body.

The means available for fulfilling this responsibility in a college department are many. I will only attempt to list them as follows:

I. Physical Examinations.
   a. Analysis and grading to show progress.
   b. Time for instruction on how to correct individual faults.
   c. Silhouetteographs.

II. Follow-up during Freshman Year.
   a. Training in fundamental freshman course by means of gymnastics with discussion of exercises and muscles used.
   b. Individual gymnastics for special cases.
   c. Movies.

d. Posture drives and shoe exhibits.
e. Instruction on the structure and physiology of the body sufficient to understand its importance in:
   1. Hygiene courses.
   2. Lectures in classes.

In summary, then, posture finds its place in our program as a valuable contributing factor to at least two chief fields of our activities. Since it is a "contributing" factor, it must not demand too much time in our overcrowded schedule of activities; but since it is a "valuable" contribution, it must have its own share of attention.

A Few Observations in Body Mechanics

LEAH THOMAS and AMY LINDNER
Smith College
Presented by Frances McInnes

AT the time of the physical examinations of the Freshman class in September, 1929, it was noted by various members of the Physical Education Department that there was an unusually large number of students with "A" and "B" posture. This fact stimulated the ensuing procedure—1. To gather as many details as possible regarding previous posture training in order to determine whether or not this specific training was the chief factor in bringing about the excellent showing of A's and B's. 2. To gather information regarding all of their previous activities in athletics, gymnastics, dancing, sports and organized games in order to determine whether or not these activities are important factors in acquiring good posture.

The procedure was as follows:—we used the list of all the A's and B's in the Freshman class and considered those as one group (a sum total of 150 students): the "C" group involved the same total number of students, and in order to obtain an average "C" group we selected the C's from one advanced Danish gymnastic class, two regular gymnastic classes, one "light" gym class and two corrective classes: the "D" group included all the D's in the entire Freshman class (61 students).

There were 650 Freshmen who entered college in September, 1929. Of this number 22 were "A" posture, 128 were "B's", 439 were "C's", and 61 were "D's"—that is, 3 per cent of A posture, 20 per cent of B, 68 per cent of C, and 9 per cent of D.

Two questionnaires were compiled and sent out to the 150 "A and B" posture students, 150 "C" students and 61 "D" students. Our statistical results are based entirely on the response we obtained from the students, and in athletics particularly, the response did not include the original number with which we started—however it was sufficient to give us material for comparison.

One questionnaire determined the previous posture training. The questions were as follows:

Did you have physical examinations (weight, height, back exam., etc.) in high school or private school before entering college? If so how many per year?

Was posture mentioned during this examination? .... Were you shown how to stand correctly at this time? ....

Did you have any posture training or posture exercises in your regular gymnastic classes? If so explain briefly.

Did you ever work to improve your posture in a small special class for this purpose or by yourself with an instructor? Explain.

Give the name of the high school or private school from which you graduated or both if you attended different schools. Give name of city and state in which the school is located.

Did you ever take dancing or riding or any activity which you think helped improve your posture? If so mention which one and how long.

Have you gone through school without ever hearing posture mentioned or ever having any posture exercises?

The answers to these questions served to arrive at three conclusions: 1. An indication that a small number (15 per cent) of A's and B's are natural posture, but that the large majority (85 per cent) of A and B postures have apparently been acquired through an understanding and training in Body Mechanics. In contrast to the 85 per cent of A's and B's with training, only 45 per cent of C's and 32 per cent of D's had training. 2. The large majority of A and B posture students came from private schools, that is, 77 per cent as against 58 per cent of C's and 45 per cent of D's; whereas the large majority of D posture students came from public schools, that is, 55 per cent as against 42 per cent of C's and 23 per cent of A's and B's. The difference in the number of students per instructor in private and public schools rather than the method of instruction may account in this instance for the higher record of work done in private schools. 3. Among all three groups (A, B, C and D) riding and dancing were mentioned by the majority of students as factors indirectly improving posture.

A second questionnaire determined the previous athletic training:

Have you been active in athletics? .....

To what extent—(maximum, medium or minimum amount)? .....

Individual sports (as tennis, track, etc.) or team sports (as basketball, hockey, etc)? Give names of sports in which you have been active.

How many years have you taken part in athletics at—elementary school... —high school or private school .... —summer camp .....

List the sports you played at—elementary school .....—high school or private school ..... —summer camp .....

Did you make any teams during high school or in private school during the four years before entering college? .....

1st teams .....

2nd teams .....

3rd teams .....

(Give name of sports)

Have you had any rhythmic, natural or aesthetic dancing? ....
(Mention the kind)
How many years? .....
In school or private classes? .....
What sport did you choose in college?.....

Three principal conclusions drawn from these questions are: 1. In comparing the maximum, medium and minimum amount of activity during previous school years, the three groups are almost equal. Among A and B posture students 25 per cent had maximum activity, 28 per cent of C's, and 23 per cent of D's. Medium activity claims the largest number, 59 per cent of A's and B's, 55 per cent of C's and 52 per cent of D's. The minimum activity has 16 per cent among A's and B's, 17 per cent of C's, and 20 per cent of D's. This indicates that the A and B group, C group, and D group in the maximum amount of activity represent an equal amount of exercise. The same is true of the other two groups. This seems to show that the amount of activity has little to do with improving posture. 2. The number of years of activity during previous school years in athletics and gymnastics was about the same in each group; that is, the larger number of students in each group had two to six years of some form of activity. If any, very little effect on posture seems to be evident through athletics and gymnastics. 3. In the choice of the most active and the least active sports in college within each group the percentage is approximately the same. For example—23 per cent of A's and B's choose hockey as compared with 24 per cent of C's and 18 per cent of D's. In archery were 8 per cent of the A's and B's, 15 per cent of C's, and 11 per cent of D's. Unfortunately we cannot quote an exact choice as existing in these sports since many wanted to take other more active sports but were unable to fit the hours into their academic schedules, while others indicated it was "compulsory" owing to some restriction in the amount of activity they were to take, as limited by the college physician.

General Conclusions from the Two Questionnaires

1. That a small number of "A's" and "B's" are natural postures, but the large majority of A and B postures are acquired through understanding and training in Body Mechanics. In contrast 85 per cent of A's and B's had training, while only 32 per cent of "D" postures had training. The "C's" in every case fell between the A and D averages.

2. The large majority of A and B posture students came from private schools while the large majority of D postures came from public schools. The difference in the number of students per instructor in private and public schools probably accounts in this instance for the higher record of work done in private schools.

3. Among all three groups, riding and aesthetic or rhythmic dancing were mentioned by the majority of students as factors indirectly improving posture. Only one student from the group of 137 mentioned athletics as a factor in improving her posture.

4. Out of 356 students only 8 came to college without ever having had any Body Mechanics exercises or ever having heard Body Mechanics mentioned.

5. Comparing the maximum, medium and minimum amount of activity chosen by students before entering college, the three groups, 1. A and B posture groups together—2. C group—3. D group, are almost equal. These percentages do not vary more than five per cent. This seems to show that the amount of activity has little to do with improving posture.

25 per cent of A's and B's took maximum activity.
23 per cent of D's took maximum activity.

6. The same fact is found for A and B, C, D students in choosing the most active and least active sports in college.

An equal amount of A and B, C, D posture students chose hockey.
An equal amount of A and B, C, D posture students chose archery.
The same is true of all other sports.

7. The number of years of activity in athletics and gymnastics was about the same in each group. If any, very little effect on posture seems to be evident through previous athletic and gymnastic training.

It might be of interest to some to note the results of two further details on the athletic questionnaire. 1. The number of students who had some training in rhythmic, natural and aesthetic dancing consisted of 62 per cent among the A and B group, 55 per cent among the C's, and 44 per cent of the D's. 2. Regarding the most popular forms of activity—at elementary school basketball heads the list for all three groups, with baseball second, games third, and track fourth; at high school or private school, basket ball is first, hockey second, tennis third and baseball fourth; at camp, swim first, tennis second, baseball third and basket ball fourth.

A most interesting and perhaps the most important conclusion is drawn into this report by a detail not listed in the questionnaire. This year, for the first time, a special privilege was granted to the Freshmen who were given a ranking of either A or B on the posture pictures which were taken in September directly after they entered college. These students were permitted to elect their activity for the winter instead of being required to take the regular gymnastic work. Posture pictures were again taken in January, 1930, to find out whether or not this posture was maintained. If the grade in any instance was lowered to a C, that student was assigned to her regular gymnastic section so that she might have at least one quarter of a year of training in the posture work which is introduced into all the gymnastic classes.

In the group of 127 students, 6 "B" students failed to report for a retake picture—therefore the computation of our results is based on 121 students who elected their winter activity. From all appearances these students were very eager to remain in that activity and not be required to take regular gymnastic work. In September 17 per cent had "A" posture against 41 per cent in January; 83 per cent had "B" posture against 48 per cent in January; and 10 per cent were lowered to a "C" grade. It must be remembered here that

the great majority of the A's and B's had posture training in Body Mechanics before entering college. All improvement that was shown was undoubtedly through an understanding and a conscious, voluntary application of the essentials of good posture. Of equal importance was the strong desire to remain in their chosen sport which proved a very active incentive to check up on their posture knowledge, apply their posture training, to confirm through physical education instructors (other than their own particular gymnastic instructor) the essentials of a correct position, and to ask their friends for suggestions regarding the correctness of their standing position,—*all voluntary effort.*

Among the 23 A's and B's in special work in the corrective department, 4 per cent had "A" posture in September against 30 per cent in January; 96 per cent had "B" posture against 70 per cent in January; and none were lowered to a "C" grade. At least one third of their work was specific posture training. The classes are small (no more than 20 in a section) which means that individual attention was given to a great extent. These students were assigned to special classes for the entire winter term. There was no prospect of changing to other activities if their good posture was maintained or improved to an "A" rank. The same incentive to improve as mentioned above was lacking. The instructor in the special classes has a difficult task planning lessons which the student will enjoy and which will not become monotonous before the end of the term. Important scientific facts regarding posture should be explained in detail in order to assure the student that actual improvement is well worth while. The test for the instructor is to keep the student enthusiastic about her own particular problem.

The comparison of results shows that the percentage of improvement in "A" posture was practically equal in both groups; that is, among the 121 students the advance was 25 points, and among the 23 students the advance was 26 points. The group in correctives scored a favorable point in that no one was lowered to a "C" grade. The 10 per cent who were lowered in the 121 group might easily be considered an indifferent number to whom activity of any sort was of little interest, or possibly those whose previous posture training was not so firmly established.

Previous training (a "carry-over" of posture work) in the larger group, plus a strong incentive inspired 25 per cent improvement. Previous training plus further training with less attractive incentive brought about 26 per cent improvement in the smaller group. The percentages seem to hold true our belief that the two following factors are of equal importance—1. An understanding of the principles of Body Mechanics and 2. An incentive to create a strong desire to acquire habits of correct Body Mechanics. The tendency in the past

has been to place more importance on the incentive than on actual knowledge of Body Mechanics. We believe that a thorough understanding of the principle of Body Mechanics is a necessary foundation for good posture and that this understanding plus the incentive will seldom fail to bring about satisfactory improvement.

STUDENTS IN FRESHMAN CLASS ('29-'30) 650

A's—3% B's—20% C's—67% D's—9%

"A" and "B" Posture Group of 150 students	No.	%	"C" Posture Group of 146 students	No.	%	"D" Posture Group of 61 students	No.	%
Had never heard Body Mechanics emphasized during phys. exam and had never taken B. M. exercises of any kind	22	15		80	55		42	68
Had heard B. M. emphasized during exam and had taken B.M. exercises of some kind	128	85		66	45		20	32

SCHOOLS

Group of 150 students	No.	%	Group of 146 students	No.	%	Group of 61 students	No.	%
Private	116	77		85	58		27	45
Public	35	23		61	42		34	55

FACTORS
Mentioned by the Students as Improving Posture

Group of 33 students	No.	Group of 60 students	No.	%	Group of 44 students	No.	%
Riding	20		26			11	
Dancing	6		20			10	
Swimming			5			1	
Fencing			1				
Athletics			1				
Orthopedic treatment	7		7			2	

127 posture pictures Sept. 1929		"A" and "B" Posture Retake in Jan. 1930			Freshmen
"A"	21—14%	"A"	51—41%	42	Not required to take regular gym on account of posture rating. Given privilege to choose winter activity.
"B"	100—86%	"B"	58—48%	48	
		"C"	12—11%	10	
	121		121		

"B"—6 (did not report for retake)

23 posture pictures Sept. 1929		"A" and "B" Posture Retake in Jan. 1930		In corrective work—assigned by Doctor's office.
"A"	1— 4%	"A"	7—30%	
"B"	22—96%	"B"	16—70%	Posture training given in class work.
	23		23	

"A" and "B" Posture Group of 105 students	No.	%	"C" Posture Group of 148 students	No.	%	"D" Posture Group of 61 students	No.	%
Maximum activity	26	25		41	28		14	23
Medium activity	62	59		81	55		32	52
Minimum activity	17	16		26	17		12	20
Not active							3	5

SPORT CHOSEN DURING 1929

Sport taken	"A" and "B" Posture Group of 105 students No.	%	"C" Posture Group of 148 students No.	%	"D" Posture Group of 61 students No.	%
Hockey	24	23	34	24	9	18
			2[2]		2[3]	
Swimming	23	22	33	22	12	19
Tennis	22	21	29	23	18	31
			3[3]		1[3]	
			1[3]			
			2			
Archery	5	8	12	15	3	11
	1[1]		3[3]		2[1]	
	2[2]		2[3]		2[2]	
	1[4]		3[5]			
Rhythms	7	6	11	7	4	8
					1[3]	
Soccer	6	5	3	2	3	5
Riding	5	4	7	5	2	3
Special Gym	1[3]	1	1[3]			
No sport mentioned	8		1		2	

[1]—wanted tennis
[2]—wanted swimming
[3]—wanted hockey
[4]—restricted in sports
[5]—compulsory

1929-1930

Activity in athletics and gym	Group of 105 students No.	%	Group of 148 students No.	%	Group of 61 students No.	%
Elem. Sch.	1		2	1		
H. S. or Priv. Sch.	18	17	19	12	11	18
Camp	3	3	3	2	2	3
Elem. Sch., H. S. and Camp	31	29	50	33	18	29
Elem. and H. S.	30	28	46	30	15	24
Elem. Sch. and Camp			1		1	1.5
H. S. and Camp	18	17	24	16	11	18
No activity in schools, etc.	4	4	3	2		
Not active					3	5

Dancing	Group of 105 students No.	%	Group of 148 students No.	%	Group of 61 students No.	%
Rhythmic	13		20		2	
Natural	9		15		6	
Aesthetic	23		25		7	
R., N. and A	4		5			
R., N., A. and Ballet					2	
R. and N.	1		5			
R. and A.	3		4		7	
R. and B.	1					
N. and A.	6		5		1	
N. and B.			1			
A. and B.	1					
Ballet	1		2			
Kind not mentioned	3					
	62		55		40	

In Some Form of Activity During
ELEMENTARY SCHOOL AND HIGH SCHOOL YEARS

Group of 105 students			Group of 148 students			Group of 61 students		
Yrs.	No.	%	Yrs.	No.	%	Yrs.	No.	%
4	16	15	6	26	17	4	11	18
5	12	11	4	21	14	2	8	13
6	12	11	8	18	12	6	7	11
3	11	10	5	13	9	5	6	10
7	10	9	12	12	8	9	5	8
12	9	8	3	10	7	7	5	8
8	8	7	2	10	7	3	4	6
9	5	4	7	9	6	12	4	6
11	5	4	10	8	5	1	3	5
2	4	3	9	6	4	10	2	3
10	3	2	11	5	3	8	1	1.5
1	3	2	1	3	2			
At camp only ..	3	2					2	3
No activity in schools	4	3		3	2		3	5
Not active							3	5

MOST POPULAR FORMS OF ACTIVITY AT ELEMENTARY SCHOOL, HIGH SCHOOL, PREPARATORY SCHOOL OR CAMP

ELEMENTARY SCHOOL

	(62) Students		%		(92) Students		%		(34) Students		%
1.	Basketball	33	53	1.	Basketball	51	55	1.	Basketball	18	53
2.	Baseball	21	34	2.	Baseball	37	40	2.	Baseball	15	44
3.	Games	18	29	3.	Track	20	21	3.	Games	11	32
4.	Volleyball	14	22	4.	Games	19	20	4.	Track	7	20
5.	Hockey	11	17	5.	Hockey	14	15	5.	Volleyball	5	15
6.	Tennis	9	14	6.	Tennis	14	15	6.	Gym	4	12
7.	Soccer	9	14	7.	Soccer	11	12	7.	Soccer	3	8.5
8.	Track	8	13	8.	Swimming	11	12	8.	Swimming	1	2.5
9.	Gym	4	6	9.	Volleyball	10	10	9.	Tennis	1	2.5
10.	Swimming	3	5	10.	Gym	7	6	10.	Riding	1	2.5
	Apparatus	2									
					Riding	3			Archery	1	

HIGH SCHOOL OR PREPARATORY SCHOOL

	(97 Students)				(138 Students)				(55 Students)		
		No.	%			No.	%			No.	%
1.	Basketball	81	83	1.	Basketb'l	109	79	1.	Basketball	40	72
2.	Hockey	60	62	2.	Hockey	72	52	2.	Hockey	27	50
3.	Tennis	48	49	3.	Tennis	58	42	3.	Baseball	17	30
4.	Baseball	36	37	4.	Baseball	44	32	4.	Tennis	13	23
5.	Track	26	26	5.	Swimming	28	21	5.	Swimming	9	16
6.	Swimming	21	21	6.	Track	24	18	6.	Track	7	12
7.	Soccer	15	15	7.	Soccer	23	17	7.	Soccer	6	10
8.	Volleyball	13	13	8.	Volleyball	18	14	8.	Volleyball	6	10
9.	Riding	9	9	9.	Riding	16	12	9.	Gym	4	7
10.	Archery	7	7	10.	Archery	7	6	10.	Riding	3	5.5
	Gym	7	7		Gym	7			Golf	1	
	Golf	4			Games	6			Bowling	1	
	Ice-Hockey	2			Ice-Hockey	3					
	Lacrosse	2			Golf	3					
	Speedball	2			Bowling	2					
	Apparatus	2			Fencing	2					
	Squash	1			Squash	1					

CAMP

	(52 Students)	No.	%		(83 Students)	No.	%		(32 Students)	No.	%
1.	Swimming	36	69	1.	Swimming	69	83	1.	Swimming	23	71
2.	Tennis	29	55	2.	Tennis	44	53	2.	Baseball	15	47
3.	Baseball	28	53	3.	Basketball	41	49	3.	Riding	12	37
4.	Basketball	27	51	4.	Baseball	40	48	4.	Basketball	11	34
5.	Riding	20	38	5.	Riding	31	37	5.	Tennis	11	34
6.	Water Sports	16	30	6.	Volleyball	17	20	6.	Volleyball	6	19
7.	Volleyball	10	19	7.	Water Sports	15	18	7.	Track	5	15
8.	Hockey	10	19	8.	Hockey	14	16	8.	Water Sports	3	9
9.	Track	10	19	9.	Track	10	12	9.	Archery	3	9
10.	Soccer	5	9	10.	Soccer	6	7	10.	Hockey	1	3
	Archery	5			Archery	6			Lacrosse	1	
	Hiking	4									
	Golf	2									
	Riflery	1									

A Resumé of the History of Physical Education in Twelve Colleges for Women

By Dorothy S. Ainsworth
Smith College

DURING the past two years a study has been made of the History of Physical Education in twelve colleges for women. Barnard, Bryn Mawr, Elmira, Goucher, Mills, Mount Holyoke, Radcliffe, Rockford, Smith, Vassar, Wells and Wellesley were the colleges included in this study. All of these institutions were founded before 1890 as liberal arts colleges.

The twelve colleges, with the exception of Mills, were visited and a complete file of the catalogues and some student publications were read. Information concerning the present situation of the departments of Physical Education was obtained through the directors or members of the department.

The material thus obtained was sorted and the story of the development of physical education in the women's colleges seemed to fall logically under the headings theory, program, equipment, department members, organization, athletic associations and costume.

The theory that some provision for exercise must be made was held by those in charge of the colleges for women from the opening days of the colleges. In fact the material in one of the first catalogues was divided into Mental Culture, Aesthetic Culture, Moral Culture and Physical Culture. The liberal arts college sought from the outset to offer a well rounded program to their students. But the statements concerning the kind and amount of exercise were extremely vague. Walking in the open air was a safe venture at least and recommended in many of the catalogues. Gradually there developed a program of physical education based upon a definite and clearly

stated theory. As the program was enlarged the equipment increased proportionately. At the same time the staff, which at first consisted of one teacher who taught calisthenics when she was not teaching something else, steadily increased as the need for more and better trained instructors became apparent.

As the number of students, staff, equipment and program of activities increased, the organization of the department became a much more complicated matter. One part time teacher and a "hall" for calisthenics was a different matter from a staff of from six to ten, two to four halls, fields, stables, boat houses, etc. Also the change from less than fifty students to from four hundred to two thousand has added to the complications.

Athletics, which in some of the colleges began as student projects with little or no faculty supervision, in most instances came under the supervision of the departments of physical education about 1900. The Student Athletic Associations had as faculty advisers members of the department of physical education. Competition for women as a result never reached the extremes found in athletics for college men. These associations turned to the promotion of an enlarged program of sports which would interest a greater number of students rather than appeal to a limited number of athletes.

The development of the costumes for sports and games was one of the most interesting sections of the study. With the change from the full, long skirted, long sleeved gymnasium dress to the present day costumes for sports there is reflected a change in attitude and opinion toward women of what is suitable and appropriate for them, a change which one would think must have taken at least a hundred years instead of a scant forty or fifty.

Through the study it is apparent that not only the costume for gymnastics and sports but the program of activities, the equipment, and even the theory of physical education for college women has reflected the changing position and conception of women in the United States in the last fifty years. It has reflected not only their ability to take on more difficult and strenuous work but the belief that the difficult and more strenuous sports and games prepared women for their increasing opportunities and responsibilities.

The detailed outline of the study is appended.

I. INTRODUCTION: OUTLINE OF THE DEVELOPMENT OF PHYSICAL EDUCATION FOR GIRLS AND WOMEN IN THE UNITED STATES

1. The colonial period.
2. The development of physical education in the secondary schools; gymnastics, domestic duties, calisthenics, dancing.
3. The school of Dio Lewis.
4. Dr. Sargent at the Hemenway Gymnasium, Harvard College.

5. The Swedish and German Systems.
6. The Informal Program.
7. Danish Gymnastics of Niels Bukh.

II. CHANGES IN THE THEORY OF PHYSICAL EDUCATION IN THE TWELVE COLLEGES

1. First statements in regard to this.
2. Various early theories resulting in domestic duties, calisthenics, light gymnastics.
3. The belief in more detailed exercises as exemplified by the work of Dr. Sargent, the theory of Swedish Gymnastics.
4. A scattered interest in the German system, Delsarte.
5. The rise of the theory of the informal program; the Ninth Year book of the National Society for the study of education, results of this theory upon the Twelve Colleges.
6. Reasons for the general acceptance of this theory in practice.

III. THE PROGRAM

1. The development of gymnastics, calisthenics, Dio Lewis, Dr. Sargent, Swedish, German and Delsarte, natural gymnastics, fundamental or Danish gymnastics.
2. The use of utilitarian activities.
3. The development of other activities; sports, dancing, outing activities, health measures.
4. The inclusion of the same in the required and supervised program.
5. The increase in number of activities.
6. Motor ability tests.

IV. EQUIPMENT

1. The development of equipment for indoor program; buildings and pools, apparatus, sanitary arrangements, rooms for games and dancing.
2. The development of equipment for outdoor program; courts, fields, track, boat houses, club houses, outing club cabins.

V. THE STAFF

1. The increase in numbers.
2. The increase in staff in relation to the increase of students.
3. Influence on staff of various schools of Physical Education; on the Directors, on the Staff.
4. Increased demand for educational background for the Directors, for the Staff.
5. Changes in titles of staff members; of the Directors, of the Staff.

VI. ORGANIZATION

1. Four groups concerned; the Administration, the physicians, the staff, the students.
2. The staff; schedules, plans or reports of work, attendance, excuses, ratings, department regulations.
3. The students; schedules, ratings, regulations, organization of athletics.
4. The physicians; relationship, physical examinations, ratings, excuses, changes.
5. The Administration; requirement, hours, credit, grades, excuses, credits.

VII. ATHLETIC ASSOCIATIONS AND COMPETITION

1. Athletic clubs.
2. The organization of the athletic associations; purpose, relation to the department of physical education.

3. Competition; intercollegiate, intramural.
4. Athletic events; gymnasium drills and demonstrations, field days, float nights, horse shows, dance recitals.
5. Awards.
6. Point Systems.
7. The A. C. A. C. W.

VIII. COSTUME

1. Earliest costumes described at Elmira, Vassar, Smith.
2. Change from dress to gymnasium suit.
3. Change to middy blouse and bloomers.
4. Modern costumes; for athletics and gymnastics, for dancing, for swimming.

IX. SUMMARY AND CONCLUSIONS

Summary of a Talk on "The Dance"

MISS MARGARET H'DOUBLER
University of Wisconsin

MISS H'Doubler feels that basically all physical education has the same aim, that is the aiding of the student to reach the realization of self and through this to achieve self expression. Such an aim concerns not only dancing but other activities as well. Whatever subject or activity the student may take leads through the knowledge of the kinesthetic self to self understanding and later to self expression.

In dancing there is a continuous pick up and release of energy which gives rhythm. This pick up and release of energy evolves into a rhythm which follows a definite beat. This beat is varied by accent, intensity and speed.

In responding to the beat, the body must move. This movement is limited only by the possibilities for movement in the body. These possibilities include flexion, extension and rotation of the various parts of the body. A varying amount of force is used by the individual in following the beat or rhythm. This variation results in different types of movement, the pull, the twist, the push, etc. This same force may be initiated by any part of the body or appendages resulting in infinite variety in the movements of the individual.

In addition movement is influenced by the laws of gravity, speed, load distribution and force.

In entering into the field of the dance the individual passes through three stages.

The first is highly rhythmical, and objective. The pupil merely follows the beat of the music with free and unconscious movements.

The second stage is still objective and rhythmical but the students can work in groups. The individual still follows the beat of music without being particularly conscious of how she is dancing.

In the third stage the dance is subjective and it is here that the dance becomes a fine art. It is no longer a matter of merely following the beat of the music; an abstract mood may be the basis of the interpretation. In this stage come two types of individuals, the artists who will go on to develop their own ability and talent, and the educators who will be interested in the dance as a means of self expression for many individuals whose skill may not enable them to reach a high level of performance but who will gain great satisfaction and benefit from dancing.

In the matter of content of the program of dancing the instructor must be careful not to force the students too fast. All students must pass through the three stages. They should not be plunged immediately into the third stage of dancing. Interpretations of moods are difficult. Expression through the dance is at first unconscious and results from the dynamic forces released by following a definite and well marked rhythm.

Rhythm is the relating of parts to the whole in time. It is a regulating force and is constantly present. The quality and power of the rhythm varies. The relating of accents is an organic thing. This grouping of unaccented beats is in our own minds. The interval which results is merely a matter of how we in our own minds relate the beats.

Different values are given the beat resulting eventually in an uneven beat. This is then expressed in movement. For example in the matter of locomotion the even and uneven beat results in quite a different type of movement. The uneven beat demands a skip, or gallop or a slide. The even beat may result in a run, walk, leap or even a hop depending upon the time of the beat.

The beats are divided in our minds into various groups by means of accent. This accent may come at even intervals. When it does not do this it produces a new sensation, a surprise element. Eventually this uneven accent works up into syncopation.

In the rhythmic pattern it is necessary to have variety, balance, contrast and unity in the whole. It results from breaking even beats into beats of uneven value and secondly of accentuating these beats in a variety of ways. After a response to accent and beat has been acquired, phrasing or grouping of notes is added. The accent and note value and phrasing in the early stage of the dance may be called the vocabulary of the dance. Dancing at this stage is purely objective and gives to the student an outlet for the dynamic forces which are basic in each individual.

From this stage the student is led into a consciousness of movement in space. The possible directions which movement may take, i.e. forward, backward, curving and sideways, are discussed and tried.

From this the student may work into a great variety of motor experiences.

Later comes a feeling of proportion in relation to melody. This brings the expression of more complex and subtle emotions.

Music and the Dance

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WHAT is the relation between music and the dance? In the beginning was rhythm, a regular group of accented and unaccented beats marking the regular pattern of the dance. There was a monotonous tonal structure at first, then variation and contrast were introduced. Melody was born out of the regularity of the structure, and from this developed the Folk Song, the foundation of music. Sir Hubert Parry says that the Folk Song was the "first essay made by man in distributing his notes so as to express his feelings in terms of design." These folk songs are the beginning of what we call melody—"sequence of sounds curved in some line of beauty."

Music has since developed until today we have compositions varying from the simple folk song to the complicated symphonies with their numerous musical instruments. The dance has developed until today we have the Folk Dance, the so-called Ballet and the Creative dance. It is the latter that is being used and mis-used throughout the country today. What place has music in the Creative dance?

We claim educational values in Creative dancing, such values as interest, initiative, self-expression, art and music appreciation. One may ask what is music appreciation? Can we obtain it through the creative dance?

In music we have three elements:

1. The space or the melody.
2. The color or the harmony.
3. The time or the rhythm.

In the dance we have a similar division:

1. The space or the design.
2. The color or the character.
3. The time or the rhythm.

All creative forms of music and dance are based primarily on these elements. Up to several years ago when a music student was given a certain composition to learn, he or she learned it note by note, measure by measure, first the right hand, then the left hand, laboriously, methodically, counting 1, 2, 3, 4—1, 2, 3, 4. Finally after hours or days of practice the composition was put together and learned. This student had undoubtedly learned what time was, what

a measure was, and what were the notes in the measure. Nine times out of ten it was a mechanical knowledge with the primary elements of space, color and rhythm omitted.

The approach of the dance and its relation to music has been much the same. We have set students to beating out time,—clap, clap, clap, clap—to the stepping out of notes in a measure, to the fitting together of these measures, to the making of dance patterns and again we have been dealing with mechanics.

What then is the modern method? A music student is given a composition to learn. Basing our knowledge on Sir Huber Parry's statement that music is a "sequence of sounds curved in some line of beauty," the student is told to play the composition through in its entirety. Play it again and again, become in that way familiar with its space, with its color, with its rhythm. Build it in curves that suit these elements, and the product will be an appreciation of the music —a rounded knowledge of all it contains.

Similarly in the dance, our method should be the same. Listen to the music in its entirety. Feel the curves of the composition, the space or design, the color or the character, and the rhythm. Build the dance on these elements, and there will be an appreciation of the music and of the dance. If we must learn a waltz rhythm by stepping out three quarter notes to a measure, by beating three quarter notes in the air with our hands, we might just as well teach it by dumbbell drills—but if we can learn a waltz rhythm by following the design, color and rhythm of the music in its entirety, then we learn the waltz rhythm with the entire body and the music and movement are one.

Looking at it in a more practical way—In musical compositions there are five means of building. Taking the theme as the building unit, it is developed—

1. By a change of mode—major or minor.
2. By simile—the theme repeated in another key.
3. By repetition—the theme repeated in the same key.
4. By inversion—the theme moves upward, then downward.
5. By rhythmical contrast.

In building a dance composition the same five means are employed, thereby relating the dance to the music inseparably. Taking the movement as a building unit in a dance, it is developed—

1. By a change of mode—emotional response, joy or sorrow, etc.
2. By simile—the movement repeated on a different level.
3. By repetition—the movement repeated either by individuals, or in group repetition.
4. By inversion—the movement upward and downward.
5. By rhymical contrast—fast and slow movement.

To go back to the three primary elements and relating them to the elements of dance composition—

1. The space or design element can be taught by:
   a. The repetition.

b. The crescendo or diminuendo.
c. The rhythmical contrast.
d. The inversion.

2. The color or character element can be taught by:
   a. The change of mode.
   b. Legato or staccato.
   c. Lyric or dramatic.
   d. Strength or weakness.
3. The Time or Rhythm elements can be taught by:
   a. The rhythmical contrast.
   b. The repetition.
   c. The curve or phrasing of the music.

There is one more important point in this rather large field of music and the dance and that is the selection of music for the creative dance. If we are to teach the appreciation of music, we must select the highest type of music available and use it as it was written. There are teachers of dancing who take a composition of Chopin or Schubert and finding that it doesn't quite suit their dance composition will calmly eliminate three or four measures, or will allow their students to eliminate three or four measures, or a page here and there. Where then is the appreciation of music and dance in its entirety? There are some teachers who will construct medleys—a few measures from Schumann, a few from Mozart, a few from Grieg and it will be one dance composition. Worse than all, there are teachers who will change the rhythm of a musical composition to suit their needs—a Schubert waltz changed to two-four time—and those who will alter the tempo to suit their compositions, slowing it here, and quickening it there, regardless of how it was originally written.

There has been some attempt to stand the dance on its own merits without the use of music. So far these attempts have, in the main, not been entirely satisfactory. In time they may be. If we continue to relate music and the dance then that music must not be mere accompaniment, but must be an integral part of the dance, and taught so that the movement of both music and body will be a "sequence of sounds and movements curved in some line of beauty."

Some Aspects of the Case For and Against Objective Testing of the Dance in Education

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PHYSICAL education is engaged in a serious effort to achieve a more wide-spread recognition as a valid educational process of unique and specific significance. One task imposed by this effort is the precise formulation of the nature and function of physical education activities. These activities, typifying free effective body movement, express the form of human behaviour through which physical

education approaches its aims and objectives. Dance, as an activity of major frequency, must, therefore, be vitally concerned with this trend toward definition and evaluation.

That some sort of rhythmics is included in the physical education program of most schools could be readily proved. In a study of students' leisure time use of physical education activities learned in state teachers colleges,[1] Dr. Ethel Saxman found it ranking high in frequency. Teacher preparation institution catalogues list it almost invariably. It is widely used in modern progressive schools, and has been a standard activity in primary and elementary schools for many years.

There is, however, no direct evidence by which the basis for its use in so many types of programs can be determined. Dr. Georgia Johnson's study of the organization of required physical education for women in state universities[2] reports some of the present objectives in selection and administration of activities. In the women's departments studied, directors named health values first and moral and social values second as their objectives. These were subjective judgments as given and there is no reason to suppose from the study that they had any but a subjective origin. The history of physical education gives the documentary evidence for the derivation of gymnastics, sports, and dance. Like the history of general education which explains the appropriation of the three academic R's to the school program, it is a history of social needs and of the translation of those needs by means of personal leadership, into educational terms. The dance in education has been endowed with the vision and energy of the personalities of its leaders. It has been inherited as a traditional activity together with gymnastics and sports, and it has been retained in practice, has moreover grown in prevalence and vitality because of this leadership and because of inherent values as yet untested except by the criterion of use.

The foregoing considerations afford a logical question. Shall the values of the dance in education be more precisely tested, or not? And if so, by what means?

It is a question and not a conclusion by virtue of the fact that there are two schools of thought in the matter. One school subscribes to Dr. William McCall's statement that whatever exists at all, exists in some amounts; and anything that exists in amount can be measured.[3] This group says, in effect, "We can and should measure."

The other school conceives of dance as an imponderable, not susceptible of such treatment without violence to its nature as a flexible

[1] Saxman, Ethel: Students' Use in Leisure Time of Activities Learned in Physical Education in State Teachers Colleges, Teachers College Contributions to Education No. 217, 1926.

[2] Johnson, Georgia: Organization of the Required Physical Education for Women in State Universities, T. C. Contributions to Education No. 253, 1928.

[3] McCall, William: How to Measure in Education, The Macmillan Co., New York, 1922, pp. 3-4.

form and its function as a free channel for self-activity. This group says, "We cannot and should not measure."

But neither group can, with probity, escape enlistment in the effort to render the educational status of physical education secure and well defined. The "measures" and the "imponderablists" alike must agree to some form of analysis of procedures and evaluation of outcomes of dance as a physical education activity. For this purpose, leadership alone cannot serve. For this purpose, tradition is a discarded argument, and purely empirical proofs break down unless they be correlated with acceptable criteria.

One approach to analysis and evaluation is certainly through the experimental method. This approach would involve the reduction of the gross activity into its specific elements, such as rhythmic response, originality in composition, and the like. Some or all of these elements would then be placed in a controlled situation and treated by a system of measurement such as statistics. Measurement would yield a result in one of two forms; either quantitative scores in units of time or space; or qualitative scores in terms of better or worse. Scores of either type would be referred to norms, or average standards, for interpretation of their meaning.

For example, a teacher of dance might set up a quantitative scale to measure rhythmic response in movement and use it to test the students in her beginning class. The result would be a series of numerical scores. If she knew what scores a large, representative number of similar students had made in the same test, she could compare her results with the average standard and determine the relative superiority or inferiority of the individuals in her class in that trait.

Or she might set up a qualitative scale to measure the worth of original dances composed by individuals in her class. In this case, she would find each dance to be more valuable or less valuable than some other, and the result would be a series of original dances arranged in rank order from poorest to best. If standards were available, she could by comparison determine the relative worth of each dance in terms of the average.

The "imponderablists" will make protest against such a cold procedure. There is at least one other way to approach analysis and evaluation. The philosophical method makes no direct application of formal experimental techniques. It is, ideally, a method of interpretation in the light of all reliable data. It observes scrupulously the principles of scientific thinking, but by its very nature, it affords no standardized unit of measure. For the purpose of evaluating motor activities, the lack of such a unit is a serious handicap.

Moreover, the ideal philosophical method is far harder to apply than are formal experimental techniques. Bias cannot be so easily

discerned nor so carefully controlled. Often what passes for the philosophical is no more than an elaboration of the empirical or a mere multiplication of errors. The process is dangerously susceptible to the influence of irrelevant forces such as private purpose, urgent expediency, or arbitrary manipulation. In its all too common form, the philosophical method presents subversive potentialities at least as distorting to fact-finding as those of the experimental method.

In the face of these obstacles, shall dance, then, declare itself exempt from analysis and evaluation? And if so, will exemption serve satisfactorily the ends of its continued educational significance? Or are there other approaches to the problem?

These inclusive questions are best left at this point as topics for reflective controversy. There are numerous sub-problems which lend themselves more readily to projected solution.

Assuming that it may be acceptable to test certain elements of dance, an available one would be rhythm, a chief characteristic not only of dance, but of all body movement. Rhythm is a variable which can be measured in standardized units without distortion. The fact that it has frequently been described as the phenomenon of periodicity or regular recurrence, defines its temporal and spatial properties and supports the assertion of its measurability.

A brief outline of a testing method will serve to clarify the point.

Rhythm in relation to the human organism presents two aspects. First, it may be perceived by the individual in any series of nervous impulses or peripheral stimuli in which it occurs. Second, rhythmic responses, implicit or overt, may be made to such stimuli. Many organic responses are characteristically rhythmic, obvious ones being heart-beat and respiration. Rhythmic responses in overt behaviour are numerous, a familiar one being regular walking. The fact that rhythm occurs in so many fields and forms renders it elusive, and hence its origin and laws of action are as yet not clearly defined. It has been investigated in the inorganic and biological sciences, in psychology, and in music. Carl Seashore includes it in his study of musical talent, and a test for sense of rhythm is one of a battery which he uses.[4] In Seashore's test, recognition of rhythm is stressed, response being by written symbols. Technical studies in psychology dealing with various aspects of recognition and response to light and sound series have been made, but the motor coordinations involved are of a diminished order. The most common one, tapping a telegraph key to reproduce patterns, is kinesthetically too limited for the findings to be more than clues for the physical educator. A survey of the literature reporting these findings is prerequisite to further experimentation since many of the conditioning specifications for practical experimentation are to be found here. But the type responses found

[4] Seashore, C. E.: The Psychology of Musical Talent, Silver Burdett & Co., New York, 1919, chap. V.

in sports and dance afford a field which is just beginning to be investigated.

The problem for the student of complex and augmented responses is largely one of devising apparatus by which presentation of series and judgment of response may be made reliable and objective. The problem may be phrased as the attempt to construct a scale for measuring locomotor or whole body response to a rhythmic auditory series; and to devise practical apparatus for presenting the series of patterns in the scale, and for judging response. The scale would range from least to most difficult pattern, and from slowest to fastest rate of presentation, thus making the test variable in two dimensions. It would purport to measure an individual's ability to reproduce in locomotor or whole body movement, at varying rates, the time values of a series of rhythmic patterns of varying difficulty. It would be desirable to test a sufficient number of cases so that norms could be established at several levels.

Whether the test would be one of fundamental motor ability or one of motor achievement is difficult to decide since rhythm has been neither proved nor disproved as an inherent characteristic. It is highly probable that learning would be a conditioning factor, as would many organic and muscular factors also.

Practical applications of the test would be as a classifying device, as a scoring or grading device, and as a control test for the study of factors affecting rhythmic response. The last named, that of a control test, would allow investigation of relationships of balance, height-weight coefficient, organic, sensory, or structural defects, to rhythmic response and learning. Correlation could also be made with such factors as intelligence and motor skills.

Achievement tests using the content materials of dance are already in use. They test such things as ability to reproduce learned techniques and dances, ability to teach, and the like. Most of these tests have been constructed to meet the needs of some local situation, and while they may be similar, they can hardly be said to be of great general usefulness. This type of test is still at the mercy of conflicting thought and practice in the field. There is at present a wide and frequently demonstrated divergence of opinion as to what constitutes an educational curriculum in the dance. What is technique to one teacher is anathema to another; an acceptable interpretation of music or idea in one school is misinterpretation in another.

Whether or not it is desirable to so standardize the content of the dance in education as to make generally useful tests feasible, is a debatable question, and best treated as such.

To summarize, it is assumed that there are certain elements of the total activity which can be suitably examined by an experimental method and more or less accurately measured in standardized units,

and that this procedure has practical applications in education. On this assumption, would a sufficient number of such tests measure the total activity? Or would they have little or nothing to do with the total activity? Or, again, would they measure only specific areas and leave such a great residuum of untested and untestable vital elements that they in themselves would serve no purpose?

The gist of the whole matter is that the women in physical education who teach or administer activity programs which include dance, are faced with the necessity of formulating a more exact statement, of reaching a more general agreement, as to what the dance in education is, and what it can and should accomplish. Two approaches to solution have been suggested, and probably a fair trial of each is imperative. The first is frank, impartial, and thoroughgoing thought and discussion, where equal representation of opinion prevails, and where all considerations of personal loyalty and private purpose are made irrelevant. This is the ideal philosophical method.

The second is comprehensive and unbiased research along experimental lines, such as those described. This, the experimental method, has its contribution to make since some of these many questions will never be answered by thought and discussion, however frank and impartial. It is inevitably from the realm of the philosophical that the problems for experimental research must arise and to which they must return that findings be tried for validity by the unabstracted realism of use. To legislate against the experimental as opposed to the philosophical is to ignore their reciprocal relationship, and to regard them as mutually exclusive which they need never be.

The conception of the dance in education as a flexible form and a free channel for self-activity must safeguard itself by an alertness to weaknesses as well as by an enthusiasm for potentialities and accomplishments. Whether one be aligned with the "measurers" or the "imponderablists," it is no longer enough to be satisfied with simple opinion, nor to rest complacently on what John Dewey has called "the Procrustean bed of habitual belief."[8]

Educational Theories Applied to Physical Education

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IT is my purpose to direct your attention to certain outstanding points in educational theory. The first has to do with time allotment in the various school divisions preceding the college level. The change in time allotment has brought equally pronounced changes in curricula. These changes are of utmost importance to physical

[8] Dewey, John: How We Think, D. C. Heath & Co., New York, 1910, p. 149.

educators whether they be concerned with college or first grade activity. The second point which I wish to present for consideration is concerned with methods of teaching. Are we conscious of method, or is inspiration, changeable though it may be, the motive force? If method is employed, of what does it consist?

One of the many Whistler stories tells us of a man who was much overcome at seeing one of Whistler's paintings. "How can you do it?" he asked. To which Whistler gravely replied, "It is indeed a simple thing, one does but select the subject and the proper colors and put them on in the proper way." That is a simple way of defining teaching—one does but select the subject—physical education; and the proper colors—activities; and put them on in the proper way—method and time allotment.

Educational Theories Applied to Physical Education

Among the more recent educational theories and beliefs we find those for the reorganization of the public school system occupying a prominent place. We find theories concerned with methods of teaching equally conspicuous. I wish to confine myself to a discussion of these two divisions of educational theory, considering them from the standpoint of physical education, in their inter-action and effect upon teaching in colleges.

A consideration of the reorganization of the public school system will show us that instead of the "eight-four" or the "four-four-four" plan, we now have the organization known as the "six-three-three" plan. The "six-three-three" plan devotes six years to the activities of the elementary school. This unit is frequently referred to as the upper and lower elementary school group. The junior high school work is organized to cover a period of three years, while another three years of public school work is found within the senior high school. This reorganization of time allotment has greatly affected the curriculum, particularly in the junior and senior high schools, and to a lesser extent in the elementary school.

In the elementary school we find little if any opportunity for election of activities, since so many activities offered in this school group are of such importance that it is highly desirable that they be experienced by all children. Physical education activities for the elementary school emphasize social relationships, rhythm work, natural activities and fundamentals of game skills. These activities may be likened to the tool subjects of academic work. They are the tools we are to use in the programs of elective activity found in junior and senior high schools, and in colleges.

Elective activities in the junior high school are limited by the previous experience of the pupil, by the vision and ability of the teacher, and the set up of the system. This statement is made upon the as-

sumption that the administrators are conscious of the value of elective activities throughout the program, in physical education activities as well as in the more traditional subject matter divisions. Elective activities within the junior high school should supplement the required activities. Social relationships will receive emphasis from a somewhat different angle than in the elementary school. Team consciousness and loyalty is rapidly developing, and individual responsibility to the group is stressed. We are somewhat in danger of stressing the group too much and of submerging personalities, instead of helping release them.

Group activities and elective activities in senior high school offer a wider range of worthwhile experiences than in the junior high school. The interest of teacher and pupils becomes constantly more social. Elections of activities which are social assets greatly exceed elections of activities carrying with them but little social prestige.

The elective activities of the junior and senior high school, and the prescribed activity of the elementary school, are comparable to the modern trend in curricula, i.e., the minimum, average, and enriched plans of work offered within a given subject. The elementary school assumes the responsibility for the minimum essentials, the junior high school for the average programs, the senior high school for the enriched program. The college is the institution whose privilege it is to offer superior programs. These programs are superior not only from the standpoint of social content but from the standpoint of social relations, both group and individual, based on the organization of required and elective activities.

The changes in organization indicate a change in method. Our high schools and colleges have been severely criticised for using elementary method in schools of secondary level. Just when should teaching of a secondary level begin? Whenever pupils are ready for such teaching. How are we to know when this readiness exists? Morrison says, "A pupil is ready for teaching of a secondary level when he has made the necessary primary adaptations in a given subject but cannot progress further without stimulation and assistance." We may find children in the fourth grade ready for teaching of the secondary level. In spite of homogeneous grouping, students requiring the elementary level, and students ready for the secondary level of teaching, are found in every class in high school or college. This fact greatly complicates the problem of method. Another difficulty in the selection of method is conditioned by the variety of reactions which we desire to produce. In the teaching of swimming we wish to remove all sense of fear and achieve a nice balance of relaxation and movement. Fear and relaxation are not found together. In dancing we want an appreciation of music and feeling for movement together with relaxation. To select a method of teaching which would

result in the desired response falling within a given category would be simple enough. But when in all teaching can just that situation be found? For combined responses we must combine methods which may differ greatly, must work them into a whole for the purpose of aiding students to acquire desired knowledges, skills, habits and ideals.

The method may be authoritative or it may be developmental. The method may be a combination of the two with the one system predominant. We find but rarely that a learning situation is carried on entirely by the authoritative or developmental procedure.

Under each procedure, the authoritative and the developmental, we find three subdivisions concerned with method. Under authoritative we find first "telling." Telling by the teacher has certain strong points in its favor.

1. By oral telling a great deal of material may be gathered together from different sources and from experiences of others.

2. The use of the voice contributes greatly to the learning situation because of the opportunity for emphasis and inflection.

3. Telling by the teacher saves time.

The second division in the authoritative method is concerned with the use of books and references. This is telling again, but in a different manner. Telling by use of books is usually better organized than oral telling and has a further advantage of being in permanent form. The advantages of the oral telling and the printed telling will be found to be unequal for certain situations and to balance satisfactorily in others. Oral telling is far superior to printed telling in teaching dancing, while oral telling and printed telling of basket ball rules balance nicely.

If the permanence of printed telling or the use of books is an advantage, then the same advantage is found in visual instruction. Visual instruction is the third subdivision belonging to the authoritative method. For us visual instruction is often pure imitation. We say "Swing your tennis racket this way" and we demonstrate the swing. Or we say "Make your waltz run soft and flowing," demonstrating as we talk—all pure imitation.

In addition to imitation in visual instruction we should include films, slides, pictures, displays, collections, diagrams, and bulletin boards, as well as other visual aids pertinent in certain situations. In choosing visual aids the adaptability of the aid to the subject must be kept in mind. Slow motion pictures of dancing are excruciatingly funny. Slow motion pictures of archery are most worthwhile and slowed pictures of tennis highly desirable. The fact that all teaching material is not of sufficient value to warrant the time expended in the use of visual aids should not be overlooked. The value of the

material may be determined by the interest in, the need of, and the probable use to which the activity will be put.

The value of the activity and the time element must be considered again when the developmental method is used. The developmental method almost invariably consumes more time than any but the last device under the authoritative method. Of the three divisions of the developmental method the deductive or problem-solving method is first. Next we have inductive method, proceeding to generalizations, and last a question and answer method, which is deductive but largely teacher motivated.

Whether the particular procedure is inductive or deductive there is a vividness of presentation in developmental method that is outstanding. Information and rules developed inductively are more completely understood than when presented by the authoritative method. Perhaps the most conspicuous result of the developmental method is the habit of thinking for oneself. This develops into increased ability to think for oneself, as well as the feeling of confidence in one's conclusions. This should be seen at its height in college situations.

A desirable method for all teaching from elementary school through college is based upon conscious use of these types of procedure, choosing always the best means from either type for accomplishing the specific end under consideration.

A consideration of method and specific ends brings to our attention the teaching of skills and the acquisition of ideals and appreciations, with which we are so immediately concerned. Habits and skills are closely related. Habits and skills are acquired only by association, by the establishment of bonds between stimulus and response which are so strong that the one automatically follows the other. The learning of skills depends largely upon previous experience. Has the experience been minimum, average, or enriched? Has the method been authoritative, developmental, or a combination of the two?

We may ask the same questions concerning the acquisition of ideals and appreciations. Has the experience been minimum, average, or enriched? Ideals and appreciations upon analysis become standards, tastes, likes, interests, and desires. Beyond all else the college teacher of physical education should be concerned with this outcome of teaching.

The method of teaching these desired qualities is perhaps even more elusive than the method for teaching the more easily defined ends. It is generally conceded that the use of subject matter appropriate for the age and maturity of pupils is of paramount importance. This is particularly true in bringing about desired attitudes, interests and ideals, for unless the sense of appropriateness is part of one's teaching equipment, tragic mistakes are made. We should strive to be

master teachers and as such possess the subtlety which helps students discover the aesthetic possibilities in physical education.

We expect to find superior teaching in lower elementary and college years. Perhaps because those years present our first and last opportunity to make our contributions for enriched living. First experiences have great vividness, so also do last experiences. To make those last experiences vital and functioning, we must achieve superior curricula and superior teaching through the constant study and application of educational theory and practice applied to physical education.

Scholarships and Loan Funds

Report by JULIA R. GRANT
Duke University

THE following questionnaire was sent to approximately 200 institutions on the A.A.U.W. approved list:

1. What scholarships in your institution are available to women for research in physical education? (Scholarships in allied fields such as education, physiology, etc., which might be used for studies in physical education should be included here.)
2. What loan funds have you which may be used by women for advanced study in physical education?

One hundred and sixty-five answers were received. The information returned which was of value for this study is as follows:

Institutions having Graduate Loan Funds

a. Available for general use:
   George Peabody—Fund for P.E. Majors.
   Stanford.
   Teachers College.
   U. of Iowa—one small loan not to be depended upon for steady support.
   U. of Mississippi.
   U. of Pennsylvania.
   U. of Tennessee.
   U. of Texas.
b. Specifically for Physical Education
   Wellesley College—Loan fund of the Mary Hemenway Alumnae Association for use of graduate students in the department—$25,000—interest of which is available.

Non-specific Scholarships and Fellowships available to Women.

George Peabody—tuition and laboratory fees.
Kansas Agricultural College—$200.
Mills College.
Mount Holyoke.
Oberlin (6) $500.
Ohio State University—$300 Scholarship, $500 Fellowship.
Phi Lambda Theta Sorority, $1,000.
Radcliffe College.
Smith College.
Southern Methodist University.

Stanford (30) $500.
Teachers College.
Wellesley (18) covering tuition.
Univ. of Denver.
Univ. of Iowa (18) $200-$300.
Univ. of Michigan.

Education Fellowships and Scholarships (theoretically available for studies in physical education).
Bryn Mawr—1 fellowship in Education, $810; 1 scholarship, $350.
Claremont Colleges—$750.
Johns Hopkins—The George Peabody Graduate Education Scholarship open to men and women residents of southern and southwestern states $400.
New York University—general scholarships in School of Education.
Smith College—Scholarships and fellowships in education.
Southern Methodist University—Graduate Fellowship in Ed. $600.
State College of Washington—School of Education (3) $300 each.
University of Chicago—education scholarships.
Univ. of Pennsylvania—some endowed and loan scholarships.
Univ. of Texas—(1).
Univ. of Wisconsin—education fellowships.

Scholarships specifically for Physical Education
University of California—"James Denman Scholarship ($200 per year) for deserving young women, preferably those preparing to enter a public vocation having recreation work with young people in large cities as their motive."
University of Minnesota—One available this year, Feb. 1, 1930-Feb. 1, 1931, graduate fellowship for a special study in physical education.
University of Oregon—Two graduate assistantships are given each year of $500 each—the students assist in 10 hours (clock) per week and have remainder of time for study. Granted to students working for the M.S. or Ph.D. degrees.

Wellesley College—
a. Loretto Fish Carney Memorial Scholarship of $1,100—income awarded to a senior in the department.
b. Research Fellowship for the Study of Orthopedics in Relation to Hygiene and Physical Education amounting to $1,000.
c. The Amy Morris Homans Scholarship Fund of $6,500—income awarded to a student in the department.
d. Graduate Research Scholarship in the Field of Women's Athletics, maintained by the Section on Women's Athletics of the American Physical Education Association, $500. (1929-30).

This was all the data possible to glean from the returns, although without doubt other important material would be revealed in a more detailed study.

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BOOK REVIEWS

THE HUMAN MIND. By Dr. Karl A. Menninger. A. A. Knopf. Trade Edition $5.00. Text Edition, $3.50.

The author, a practicing psychiatrist of the younger school, starts with the sensible thesis that the mind is not a machine operating perfectly and invariably in a quiet little laboratory. Rather it is a collection of enormously complex possibilities for variation, most of the variations being called abnormal by people with some other kind of variation! Then since one's variations determine his personality, little hope or comfort can come from the adjuration to be "normal," when that word means close to the average and mediocre. Indeed, any one who achieves anything is, *a priori*, abnormal.

Whence come these making or breaking variations? Contrary to the views or other psychiatrists and many eugenicists, the author believes that the effect of heredity is probably confined to physical structures, including brain patterns. He agrees that certain kinds of feeble-mindedness are inherited and admits even the possibility of an inborn schizoid constitution. Functional propensities are in his opinion usually acquired rather than inherited, and here he includes nervousness, indigestion, alcoholism, a sense of humor, temper tantrums and behavior problems in general. Later in the volume he comes nearer the broader, biological viewpoint when he writes that "no one is made sick merely by his environment. Instead, it is the result of the combination of personality trends (heredity?), environment, and the effects they have produced on one another in the past." Biologists at large will sympathize with Dr. Menninger's insistence on the need for scientific study of the environment, since that field is just in its incipiency. It is only fair to state, however, that some of them believe that man has a part in making his environment; others, that the environment is always fit, the test of the organism being its persistence therein. Dr. Menninger tells us "that in general no branch of medical science, with the exception of obstetrics, is blessed by so many recoveries as is psychiatry." That being the case, all must look with favor upon its efforts to assist maladjusted but otherwise eugenically worthy individuals to face the realities of the environment, obscured as they may have been by an increasingly complex civilization.

The non-technical, witty, yet sympathetic treatment in this book of such subjects in the popular mind as complexes, frustrated personalities, psychoanalysis and the like should greatly appeal to the lay reader. The educational, legal and business worlds may well consider the injunctions given in the section on the applications of psychiatry. Similarly, it should be of great value to the clergy, personal administrators and social workers, and indeed all who have to deal with human beings as individuals.

N. M. Grier,
Evansville College,
Evansville, Indiana.

SYMPOSIUM OF PHYSICAL EDUCATION AND HEALTH, compiled and edited by Jay B. Nash; New York University Press Bookstore; pages 320; 1930.

This book is a collection of twenty-eight papers or speeches delivered at the ceremonies connected with the dedication of the new building of the School of Education, New York University. The theme is the oneness of

mind and body. The speakers represent a selection from amongst the leaders of physical education and allied sciences in this country.

As is true with most symposiums the contents of this book are a bit spotty. Some outstanding papers alternate with addresses of a rather mediocre character. There is enough of very high calibre, however, to make this book well worth the price for the library of the scientific physical director. The papers of Dr. Nash on the subject of "An Interpretation of Physical Education" and the "Administration of Health and Physical Education" are especially thoughtful presentations of the point of view of the New York School of Physical Education's philosophy. The contributions of Dr. Burnham on the "Development of the Wholesome Personality," Mr. Lloyd's paper "Opportunities for Character Education through Physical Education," Dr. Lawton on "Physical Education as a Profession," Jacobsen's paper on the "Administration of the Health and Physical Education Program of the Public Schools" and "Health as the Integration of the Living Mechanism" by Miss Hussey, are all exceedingly thoughtful and helpful contributions.

A number of the papers included give the impression of having been abstracted—and of having been abstracted too briefly.

Contributions by biologists, physiologists, and psychiatrists too numerous to be discussed in a book review are also outstanding.

The book is paper bound and deserves a larger use than such a binding would suggest.

C. H. McCloy,
University of Iowa.

ATHLETICS IN EDUCATION. By J. F. Williams and W. L. Hughes. W. B. Saunders Company, 1930. Pp. 414. $3.00.

This very excellent book discusses the organization and conduct of athletics primarily from the educational point of view; a view-point which must increasingly prevail if athletics and coaches of athletics are to assume a less precarious position in the educational institutions in this country.

About a fourth of the book is given over to a thorough discussion of the philosophical problems of athletics; problems, aims, objectives, history, and policies, in which there is on the whole a very fair-minded consideration of opposing points of view. Some positive statements are made, such as the opinion of the authors on the question of track and field athletics for women, which seem to the reviewer to be based upon very shaky and insufficient evidence, but these are few and do not mar the value of the book as a whole.

The middle half of the book discusses the administration of athletics and does it thoroughly and completely. The selection of staff, organization, finances, equipment, management, construction and maintenance, and a host of other important problems are handled thoroughly and in a scholarly fashion. The general discussion is supplemented by a wealth of practical illustration so that the book may be used by those with relatively little experience.

The last quarter of the book is given over to an especially complete annotated bibliography. This covers almost every phase of athletics discussed and directs the reader to more detailed discussions, particularly of controversial subjects.

This book will be invaluable as a textbook in the administration of athletics and as a handbook for the director of athletics in any kind of institution.

C. H. McCloy,
University of Iowa.

THE Y.M.C.A. PHYSICAL DIRECTOR by L. W. Bartlett and A. W. Boyd. University of Chicago Press, 1929. Pp. xi plus 104. $2.00.

This study is a job analysis of all of the activities of a Y.M.C.A. physical director. The scope of its usefulness, however, is considerably greater than is indicated by the title. In the first place there is an excellent discussion in a relatively small number of

pages of the whole technique of job or activity analysis as applied to the study of problems of physical education. This study took advantage of latest developments in this field and can be considered as thoroughly up-to-date in this method. Directors of professional courses of physical educational, research workers, and others wishing to make studies involving the job analysis techniques will find this perhaps their best reference as to method.

Over five hundred activities of the Y.M.C.A. physical director are listed and these have been checked for frequency of performance, difficulty of learning, importance, and whether or not it would be best learned at school. A copy of the questionnaire is given together with summaries of the results. Since so many of the problems and details of the work of the Y.M.C.A. physical director are common to teachers of physical education in all institutions the book can be studied with profit by any thoughtful teacher of this subject.

The section of the book dealing with method, which comprises forty pages, is easily read. The remainder of the book which discusses the study itself is not the type of thing that can be mastered in an evening. It is the type of material which must be studied slowly and carefully before very much of value will come out. It will, however, repay time spent.

C. H. McCloy,
University of Iowa.

NURSING IN EMERGENCIES. By Jacob K. Berman, A.B., M.D. The F. C. Moseby Co., 1929. 160 pages. $2.25.

The author states in his preface that this book "is the result of a course of lectures" given to student nurses in a hospital school of nursing. The book deals with the contents of a first aid kit for nurses; a list of thirty-four poisons and their antidotes; diseases such as phlebitis, thrombosism, embolism; bandaging; injuries of bones, joints, muscles; obstetrics and gynecological emergencies; the use of the hospital in emergencies; supplies needed in some of the most common emergencies.

In the first aid kit which is supposed to be used by nurses, there are listed drugs and instruments which if nurses used even in emergencies, would cause them to be summarily dealt with by law for practicing medicine and surgery without a license. It is not the province of the nurse to function as a physician even in an emergency. It would appear that the author has for the moment forgotten his aim and has listed the things which a nurse might keep in readiness for a physician, were she to assist him in an emergency. Use of household articles in an emergency is dealt with in six lines.

In her regular course in chemistry and materia medica the nurse in a good school of nursing learns much of the reaction of drugs. This is of infinitely more value to her than to memorize a list of poisons and their antidotes. The treatment recommended in this book for cases of poisoning is largely medical treatment when the cause of the poisoning has been ascertained. The author does not give any method of discovering the cause of poisoning.

In the chapter on "shock" the treatment is outlined after the patient "has been wheeled into the anaesthetic room after a diagnosis of his injury has been made." In this instance, as in many others in the book the "nursing in emergencies" is under the direction of a physician, although the preface states that "the nurse must work quickly and correctly—she has no doctor to turn to for advice—"

The chapter on bandaging shows various cuts of intricate and beautiful bandages, but scarcely the kind which would be used in an emergency. The handkerchief bandage, the most common appliance used in first aid work, is shown once for immobilizing an ankle.

To summarize—all of the information contained in this little book is important for every student nurse to acquire in her course in nursing education. She will receive this instruction

through her theoretical work and her practical experience in surgery, in obstetrics, in chemistry, in materia medica. This book does not prepare her to meet emergencies which she may encounter, where there is no physician. The surgical instruments and transfusion sets will be of no use to her then. The nursing care in emergencies is most inadequately dealt with.

Mary Ella Chayer,
School Health Dept.
Des Moines, Iowa.

"RACIAL HYGIENE." By Thurman B. Rice, M.D. Published by MacMillan Company, 376 pages. $4.50.

Eugenics aims at upbuilding of the human race in order that greater efficiency and happiness may eventually be attained by a constantly increasing proportion of the people. There are involved at least two major aspects of life, namely, the sociological and the biological. As to their relationship, the author accepts the attitude that the biological is fundamental, and hence finds a case for emphasis on eugenics. Since the ultimate result sought is that *all* shall benefit, it is evident that hereditary laws and tendencies should be understood by the general populace. If this text undertakes to state in non-technical terms the most significant findings from a wide field of experimentation, such conclusions being too frequently couched in technical phraseology and so not understandable by the laity, one may fairly raise the question of the possibility of presenting the science of heredity in terms understandable by those lacking at least an elementary knowledge of the biological science.

The author has undertaken this extremely difficult task, and with the exception of chapters V and VI, has succeeded particularly well. The introductory material, chapters I to IV, is well stated and understandable by those of ordinary intelligence and education, but chapters V and VI on the germ cells and Mendel's law must, from the very nature of the case, prove decidedly difficult for the general reader.

The remainder of the text is well written, interesting, conservative and eminently educational. It includes among other topics those of special inheritance, economic problems, laws and customs relative to courtship, marriage and divorce, factors in marriage selection, birth rate, influence of education, emigration and immigration, dominance of the white race, and the application of biological laws to social problems.

Regarded as a whole, the text constitutes a splendid contribution to the subject. It is free from extreme and faddish ideas, and where the author introduces, as he admittedly does, his own views on some technical point, he does not belittle the bases for other attitudes.

If the science of eugenics is to contribute an important element in the solving of racial problems, social as well as physical, it must depend upon the general enlightenment and motivation of a large precentage of the population. Dr. Rice's text will help much in this direction.

G. B. Affleck,
Y.M.C.A. College, Springfield.

VALUES AND METHODS IN HEALTH EDUCATION. By Walter Frank Cobb, M. D. Row, Peterson & Company, Evanston, Ill. 1929. 368 pages. $2.00.

Not only in theory and in committee reports is health recognized as a prime objective of education, but some school systems and some institutions of higher education are definitely organizing their working curricula so as to apply the principles now very generally agreed upon, those concerned with the high value of health in its broadest sense.

One of the problems met by those who would introduce health education as an integral part of the school program has been to find methods to present adequate facts, and particularly to so motivate the subject as to develop healthful attitudes and habits in the pupils.

This is exactly where Dr. Cobb's text meets a need. The material is well selected and arranged, its presentation

through illustration and play forms is decidedly unique, and its appeal to youth is strong.

In structure the plan is to have each of the chapters given a catchy caption, followed by the hygienic facts, in turn followed by suggestions on methods of presentation and teaching devices. At the end of the chapter is a brief chapter summary and a bibliography of selected references, so that the teacher who desires to read more widely may do so under guidance.

For all teachers who are interested in the physical welfare of pupils, this book will not only prove interesting but profitable. Its merit is attested by the fact that it has been included in the N.E.A. list for the year.

G. B. Affleck,
Y.M.C.A. College, Springfield.

THE WHOLESOME LIVING SERIES. By Jesse Feiring Williams, M.D., and Theresa Dansdill, A.M., published by Benj. H. Sanborn & Company, Boston, 1929. "Health and Control," 209 pp. 68c. "Health and Service," 228 pp. 72c.

One of the gains in health promotion is the appearance of texts prepared and presented in such a way that they are attractive and interesting without sacrificing scientific accuracy.

Prominent among these is the "Wholesome Living Series," of which two books are considered in the present review.

"Health and Control," the third book in the series, designed for the pupils of grade V, is devoted to the idea that health is much more than mere physical well being; it includes *all* life and involves the conscientious formation of habits, development of skills and ingraining of attitudes.

On the basis of three rules for each of thirteen desirable health habits, the authors have worked out one chapter for each habit including Building Health and Control, Keeping Clean, Weighing and Measuring, Food and Its Uses, Foods and Eating, Food and the Teeth, Play, Work and Rest, The Out-of-Doors, The Indoors, How the Muscles Work, Safety, Alcohol and Drugs, Courtesy and Control.

"Health and Service," Book 4, prepared for grade VI., proceeds from the basis of individual health, considered in book 3, to view the social relations of each pupil to the group as well as the relations of one group to another. It re-emphasizes health not as a subject to study but as a way of living, and as an essential part of community life. On this basis of service are considered such phases as health and food, how the body serves, the home and school service to the neighborhood, and hindrances to services, including injury, tobacco and alcohol. The book concludes with the idea so splendidly set forth in the first part of Dr. Williams' text on "Personal Hygiene Applied," namely, the fundamental principle that health consists in "living most and serving best."

The type is large, headings are in bold face letters, illustrations are ample and well chosen, score cards are suggested for personal records, and leading topics are suggested for class consideration and personal reflection; and there is always included a list of things to actually *do*.

This series, completed by the Teachers' Manual, offers one of the most satisfactory of the many publications designed to aid both teacher and pupil in realizing the benefits of the educationally significant emphasis on health education. It deserves the widest publicity and use.

G. B. Affleck,
Y.M.C.A. College, Springfield.

ELEMENTS OF THE FREE DANCE. By Elizabeth Selden. A. S. Barnes and Company, New York. 1930. 163 pp. $1.50.

Any book dedicated as is this one, "to the cause of study and criticism of the Free Dance," and issued in an era of dance renascence, must find at once its own unique audience, a substantial part of which is certain to be those physical educators who have for some time been dancing, studying and criticising with notable freedom. Since it is imperative that dance as an educa-

tional form take cognizance of dance as an art, Miss Selden, herself a dancer and dance teacher, renders specific service to this professional group among her readers in presenting the first inclusive technical discussion of modern dance theory.

The opening preface commands instant attention by the discrimination with which its salient points are chosen. It encompasses major problems in the integration of the new dance movement. In assembling the glossary which closes the book, the author has made an effective attack upon one of the most urgent of these problems—that of divergent terminologies. Whether this glossary be universally satisfactory or not, hardly matters; the mere fact that a glossary now exists in print is sufficiently significant. "The Free Dance" (to use the key term from the list) has been a veritable Tower of Babel, cursed with many languages, to the increasing confusion of its more inspired prophets and the entanglement of their fervent messages.

The main discussion is in three sections: "The Inner Necessity," a philosophical treatment of the nature of dance as an expressive medium; "Comparisons," an excellent differentiation of the two great trends—the ballet and "the free dance;" and "Building Stones," an analysis of the principles of free dance movement.

It is perhaps partly due to the unusual constructions of Miss Selden's English style—a language not native to her—and partly to her approach which is primarily emotional, that the first section leaves the reader somewhat confused. It is true that throughout the book, the author disclaims any thesis. Her avowed purpose is to record, not to argue. Nevertheless, even an impartial record must follow a definite direction if it is to be satisfying, and in "The Inner Necessity" the reader is frequently taken into bypaths which make no apparent return to the main line of ideas.

In "Building Stones" the author essays the task of picturing body movement through verbal images. The preface states that the book eschews a selective view-point on technique. Considering this section, one wonders whether free movement can be defined in any truly universal fashion at this stage of rampant individualism in dance history. Miss Selden, by defining, tends to select, in which trait she but follows many precedents.

The section comparing the ballet and "the free dance" is not only searching, but admirably unbiased as well.

Although, as the author notes, no single book can cover the entire field of modern dance theory, the appearance of this provocative and intensely sincere work marks a generous advance in the progress of the cause to which it is dedicated.

Mary Jo Shelly,
Columbia University.

THE ART OF SOCIAL DANCING. A Text Book for Teachers and Students. By Lawrence A. Hostetler. A. S. Barnes and Company, New York, 1930. 140 pp. $2.00.

The contribution of Mr. Hostetler's text is enhanced by its timeliness; its publication coincides with a changing attitude which marks the decline of a venerable taboo on social dancing within the school. Arising as an informal, student-initiated activity, much in the manner of the inception of school athletics, the social dance is rapidly achieving respectable status in the curriculum, more frequently than not under the auspices of the physical education department.

As the author notes, the literature in the field has been more profuse than practical, and this text is designed to meet the resultant need.

Part I of the book covers principles in the form of an amplified discussion of four factors fundamental to skillful performance which are listed in the preface as: poise, position, relaxation, and the ability to lead and to follow. Sense of rhythm is omitted because, the author explains, faulty rhythm may be traced more frequently to lack of poise and relaxation than to ab-

sence of ability to move rhythmically. The analysis of the basic dance-walk (Chapter III), is outstanding for clarity and thoroughness. Throughout the discussion, effective use is made of specific cues for the correction of common faults. The series of relaxation exercises given in Chapter IV, however, is hardly practical for use in the ordinary teaching situation, even were professional opinion to sanction such use.

Part II outlines the three current dances: the waltz, fox-trot, and French tango. Basic steps, fundamental figures, and figure combinations for each dance are described, and directions for the lead in each figure included.

The book, as an organized compendium of teaching method, is a useful text for the physical educator undertaking instruction in this activity. As with all such texts, its usefulness is increased in the degree in which the teacher is herself already a performer.

An acceptable companion volume would be one issued from within the educational profession in which the social dance was evaluated as an educational activity.

Mary Jo Shelly,
Columbia University.

AN OUTLINE OF PHYSICAL EDUCATION FOR FIRST AND SECOND GRADES. By Leonora Andersen, B.S., M.D., and Florence McKinley, B.S., Director of Physical Education for Women, State Teachers College, Winona, Minnesota. Published by A. S. Barnes & Company, New York—1930. 137 pages. Price $2.00.

Since physical education in the first and second grades may well be considered the most valuable contribution of the profession in the educational field, this new book should be warmly received by all who are concerned with teaching on the primary level. The material presented by the authors reveals a progressive and modern viewpoint. It would fit easily into a so-called activities curriculum, and its emphasis on rhythmic and dramatic training involving large fundamental muscle movements strikes the keynote of present day opinion concerning children's work.

The book comprises four sections devoted to: dramatic play with music, dramatic play without music, games and stunts, and typical monthly programs.

The most important section of the book, that devoted to dramatic play with music, contains a large number of original musical selections. These should prove to be a great boon to teachers who find difficulty in securing music with the appropriate rhythm patterns to accompany their lessons. The authors recommend a constant appeal to the things familiar to the child. Hence there are rhythms which provide for the interpretation of circus animals, types of locomotion, fairy tale characters, barnyard animals, and the like. If the plan of the lessons is carried out, the children will have ample opportunity for creative rhythmic activity. A list of appropriate Victrola records is included in case piano music is not available.

The dramatic play without music is carried on by dramatizing stories to give varied and vigorous physical activity. The material is in part original and in part taken from the familiar literature of childhood. The real success of a story play depends upon the ability of the leader to draw suggestions for the activity from the children themselves. The authors give many helpful teaching suggestions accompanied by the best of material.

The primary teacher is, let us hope, equipped with several volumes of games books, and needs only a little advice in order to select a good program of games and stunts. Those presented in this book are well chosen and should serve as a reliable guide in choosing others equally suitable.

The outstanding features of the book seem to be its contribution to the problem of rhythm training and the wide variety of the material made available in one volume. It should be accepted as one of the indispensable teaching manuals.

Emma F. Waterman
New York University.

TRACK AND FIELD FOR WOMEN. By Alice W. Frymir. Published by A. S. Barnes and Company, New York. 1930. 208 pages. Price $2.00.

Like many attempted censorships, the rather general publicity voicing definite disapproval of entering our girls in the track and field events in the approaching Olympic games, has precipitated a lively interest in that particular branch of athletics. Very timely then, is this book on track and field for women. The author takes no part in the controversy concerning the Olympic competition, and apparently concludes that since track and field exist, the best procedure is to insure for their participants, a proper training and coaching.

It is no exaggeration to say that Miss Frymir's book is an outstanding contribution to this field of activity as specialized for women. There is a detailed discussion of the form for each event generously illustrated by photographs which clearly reveal a high standard of performance. This together with suggestions for training and coaching is presented for each of the following: sprinting, relay racing, hurdling, running high jump, the broad jump, hop, step, and jump, javelin throw, discus throw, shot put, hurl ball, basket ball and baseball throw.

Valuable suggestions for squad classifications, programs for mass competition, and the organization of a track meet round out the usefulness of the book.

The introductory chapter on the history of track and field, while it contains interesting facts, is put together in such a fashion that it really adds little to the discussion at hand. However, it would be a stout task for a real historian to amalgamate the facts concerning the practice and policies of track and field from 776 B.C. up to the present date.

Since the main issue at stake in the arguments concerning these activities for women is the physiological effects upon those participating, it is to be regretted that the chapter entitled "Training" reveals such a lack of accurate scientific information. The following illustrates this inaccuracy: "A state of bodily strength and reserve force, in which every organ is healthy and subject to the control of and direction of the mind, should be the training objective." Such a statement compels one to wonder just which organs the mind has ever been known to control! Again, considering the number of studies recently devoted to the topic of fatigue, it is somewhat surprising to read that "in the untrained individual, muscular fatigue precedes nervous fatigue, while in the trained individual the reverse is true." Inaccurate statements which conflict with scientific opinion must weaken any attempt at a justification of the activities. The recommendations regarding the procedure of training are all pertinent and well considered.

As regards the details of the performance of the events themselves, the author reveals a wealth of knowledge and a real ability for accurate descriptions of their difficulties and possibilities.

Emma F. Waterman,
New York University.

TAP DANCING: Fourteen routines with descriptions and references to appropriate music. By Marjorie Hillas. A. S. Barnes Co. $1.00.

Dance routines solve entertainment problems so pleasantly and so effectively that there is always an appreciative public of teachers, students, and amateurs awaiting their appearance. Teachers of advanced clogging as well as teachers of tap will find this cleverly arranged book suggestive of means for introducing interest and variety into their work. Many of the routines can be adapted, some with very few changes, to clog patterns.

Perhaps Miss Hillas would object to this application of her work, for she says of clogging in her foreword that "modern music is never used as it would change the emphasis of the dance from folk to jazz." Surely modern clogging teachers will feel that this limits their province too narrowly. In my opinion, the difference

between clogging and tap is not at all in the music used, but only in the dance patterns and technique themselves. As Miss Hillas says, the clog is primarily a character dance, but it is by no means limited to the few character types expressed in folk-tunes, nor, when it graduates from the use of these folk-tunes to the use of jazz, that is, from a regular to a syncopated rhythm, does it encroach on the well-defined domains of the tap, unless it changes its emphasis from movement to sound.

Clogging appeals to the eye. It strives for a variety of movements with only secondary stressing of sounds. A tap dancer may use more actual movements than a clogger, but these movements are not meant to be conspicuous, are not an end in themselves as in clogging, but are only incidental in the producing of sounds. The two can express themselves to the same music as well as the drummer and the man who wields the baton. It is rhythm that differentiates between clog and tap dancing.

The music chosen by Miss Hillas is admirably fitted to the routine and is "peppy" enough to be interesting on its own account. A valuable feature is the inclusion of the composer and publisher of each piece suggested and the Victor record numbers of those that have been mechanically reproduced. Teachers are sure to find this very important book constantly useful both in the class-room and for reference.

Augusta Harris,
Instructor in Clogging,
Michigan State Normal College,
Ypsilanti.

ELEMENTARY TAP DANCES. By Katherine Ferguson. Woman's Press. Pp. 22. $1.15.

This is a valuable book for Junior High teachers, as it provides a sort of intermediary between clog and tap. Miss Ferguson explains well the difference between the two in the "Foreword" and by proper emphasis introduces the tap technique in a natural manner that makes the progress from clogging to tap easy and almost unconscious.

The music chosen is popular with young students and introduces in a simple way the sort of accompaniment they will use as they progress. Users of the book will appreciate the printing of the music under the same cover as the dance routines.

The suggestions for costuming and the direction for entrance and exit steps, all are features which make the book an aid in putting on exhibitions. On the whole this is one of the best elementary texts in tap dancing adapted to students of the Junior High School age.

Augusta Harris,
Instructor in Clogging,
Michigan State Normal College,
Ypsilanti.

THE RHYTHM OF THE REDMAN. By Julia M. Buttree. 261 pages. Illustrated in colors. A. S. Barnes. $5.00.

Julia M. Buttree in *The Rhythm of the Redman,* published by A. S. Barnes and Company, has made a splendid contribution. She has shown an understanding and an appreciation of the American Indian which has given her work particular value and depth. This fine addition to Indian rhythms and dances will be especially welcome to physical educators, because material of that kind has been rather limited and not always authentic.

The book, attractive both for workmanship and presentation, is the result of the author's long study of the subject and of recent research among the Western Indians. It is made up of four parts; with an interesting preface by Miss Buttree and a rather striking introduction by Ernest Thompson Seton, which I am certain will challenge many dancers and dancing teachers. The illustrations, also by Mr. Seton, are colorful, clear, and delightful.

Part One is given to explanations of the fundamental steps and to the descriptions and music for nearly fifty

dances, carefully illustrated by pictures and diagrams. Part Two is devoted to important ceremonies and their significance. Part Three treats of Indian music and musical instruments. There are altogether many interesting songs of a variety of types. Part Four is prepared by Ernest Thompson Seton on Indian art. This section is particularly valuable for pageantry, camp work, and woodcraft, as definite instructions are given for making and painting Indian materials.

The Rhythm of the Redman stimulates one to know more about the Indian, especially of his dancing and music. I believe the book has a place of great importance in many phases of educational work.

Grace L. Ryan.
Central State Teachers College,
Mt. Pleasant, Mich.

BOOKS AND REPRINTS

of the American Physical Education Association

Address Box 362, Ann Arbor, Mich.

The recently published study "Physical Education Curriculum in Professional Schools" by the Committee on the Curriculum of the 139 institutions preparing teachers of Physical Education in the United States is available at the regular prices, i. e., $5.00 single copies, and $3.00 each additional copy.

The "Review," back copies to 1898: Single copies, 50c; three copies, $1.00; One volume, ten copies (unbound), $3.00; One volume, (bound), $5.00. (Postage prepaid).

The "Pentathlon" for Oct., Nov., and Dec., 1929, 25c each.

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